JANUARY, 1942

# Coal Age

McGRAW-HILL PUBLISHING COMPANY, INC. TWENTY-FIVE CENTS PER COPY

**CHARTING THE FUTURE**
The Job Ahead for Coal Mining

•

**REDUCED-VOLTAGE START**
Accomplished at the Generators

•

**MECHANICAL COAL MINING**
In the Elkhorn Seam of Kentucky

•

**PINE RIDGE CAR SHOP**
Designed for Economical Operation

•

**NEW DITNEY HILL MINE**
Laid Out on Mechanical Basis

•

**OPERATION AND SAFETY**
Covered in Five Institute Meets

•

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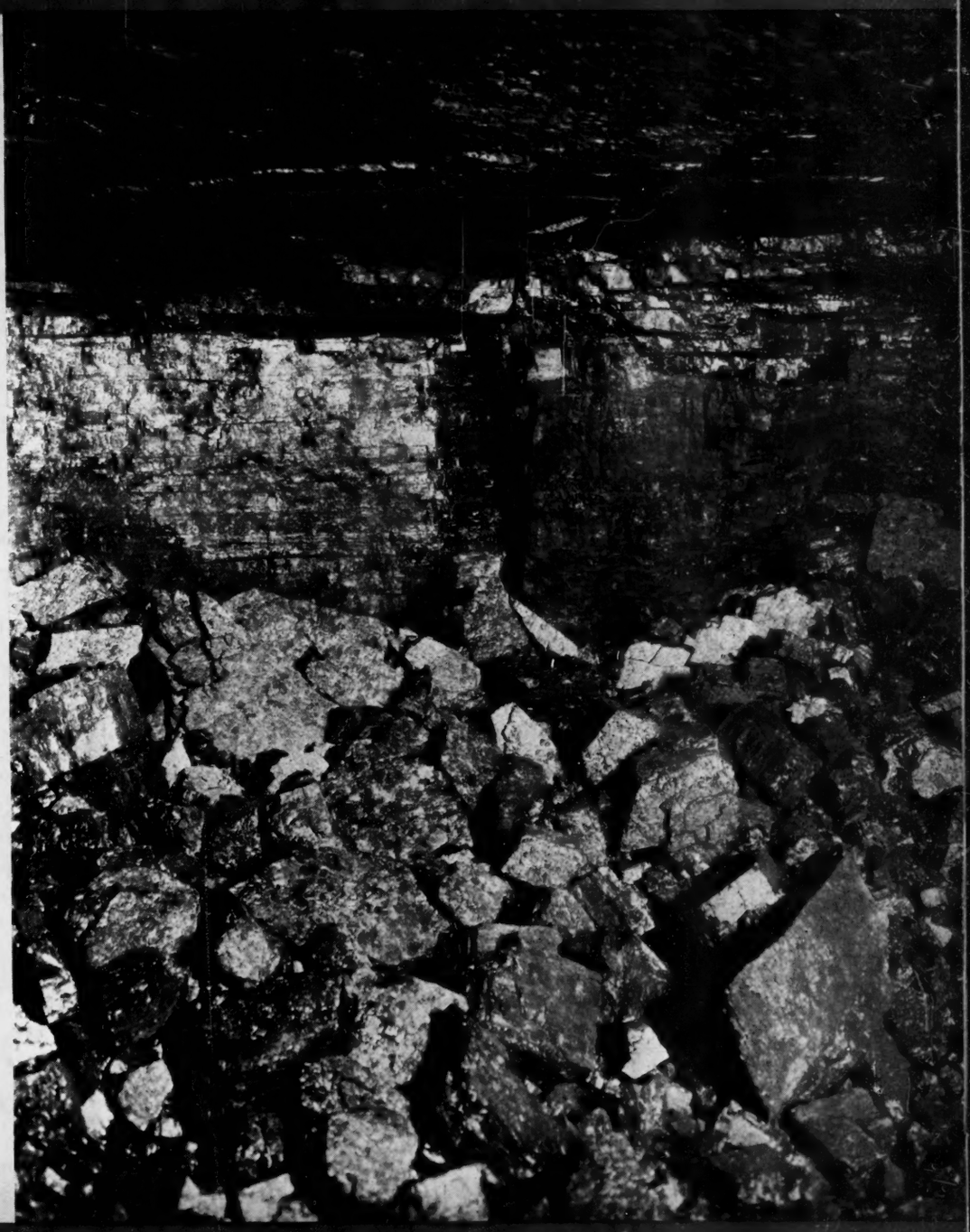

Spring in the mine. Three of it is now the big problem of the coal industry.

# "Trouble..a Thing of the Past

## SUN MINE LUBRICANTS

### Made Clutches Behave..Helped Maintain a High P-Q*

Mining machines had to be shut down every two weeks for cleaning clutch discs in a large Pennsylvania mine . . . maintaining a high P-Q (Production Quota) was out of the question. Finally, a SUN Oil Engineer — one of those "Doctors of Industry" — was called in. He recommended a change to SUN Mine Lubricant.

Now the mine superintendent reports "Clutch trouble is a thing of the past" . . . machines have operated more than a year without a stop for clutch cleaning . . . lubricating costs have been cut 25% . . . power drag reduced 20% — since standardizing on SUN Mine Lubricants.

Just another case history that explains why leading mine operators are specifying SUN Mine Lubricants from seam to chute to —

- OBTAIN PEAK PRODUCTION
- STEP UP LUBRICATING EFFICIENCY
- CUT MAINTENANCE COSTS
- REDUCE POWER DRAG

If lubricating troubles are robbing your machines of valuable production hours, now's the time to have a SUN Oil Engineer show you how correct lubrication can help you maintain a higher Production Quota. Write SUN OIL COMPANY, Philadelphia, Pa.

*PRODUCTION QUOTA

SUNOCO

SUN PETROLEUM PRODUCTS HELPING INDUSTRY HELP AMERIC

# They took part of a washing machine and made powder plants safer

## *A typical example of Goodrich improvement in rubber*

WHAT used to shock your wife could cause an explosion in a powder or chemical plant today. Could, but won't.

Many clothes-washing machines have rubber "V-belts" for smooth, quiet running. But the whirling belt *used* to build up enough static electricity to give a woman an annoying jolt. Rubber being an almost perfect insulator, the static could not flow to the ground. Attempts to make a belt to carry electricity away had resulted in nothing but a surface treatment which soon wore off.

The same V-belts for the same reason caused static sparks in factories — of deadly danger when the plant made powder, chemicals, gasoline.

Engineers of B. F. Goodrich attacked the problem. But since nature made rubber an insulator, wasn't it ridiculous to think of making it *carry* electricity? Yet the Goodrich engineers, with years of experience behind them of doing "impossible" things with rubber, finally developed a rubber compound which actually transmits electricity, and all problem of static in washing machines was ended.

Then powder plants, chemical factories, other hazardous industries began hearing of this new belt. Static in such plants has caused sparks that set off terrific, deadly explosions. The new Goodrich belt is now going into these plants, and they will be safer, defense workers will run less risk—all because continuous research in rubber has been a life-long B. F. Goodrich policy. *The B. F. Goodrich Company, Mechanical Goods Division, Akron, Ohio.*

**B.F. Goodrich**
*First* IN RUBBER

# LOOK BACK OR AHEAD MR. JANUS-1

Janus, the god of past and future performance looks with a kindly eye on users of Hulburt Quality Grease. In January, his namesake month, inventories are taken. Maintenance and lubrication costs and over-all time records are examined. These records show well for those who have used Hulburt Quality Grease—the only grease made exclusively for coal mine equipment. Let Hulburt Engineers show you how to speed production, reduce lubrication time, and decrease maintenance costs in 1942.

**HULBURT OIL & GREASE COMPANY**

*Specialists in Coal Mine Lubrication*

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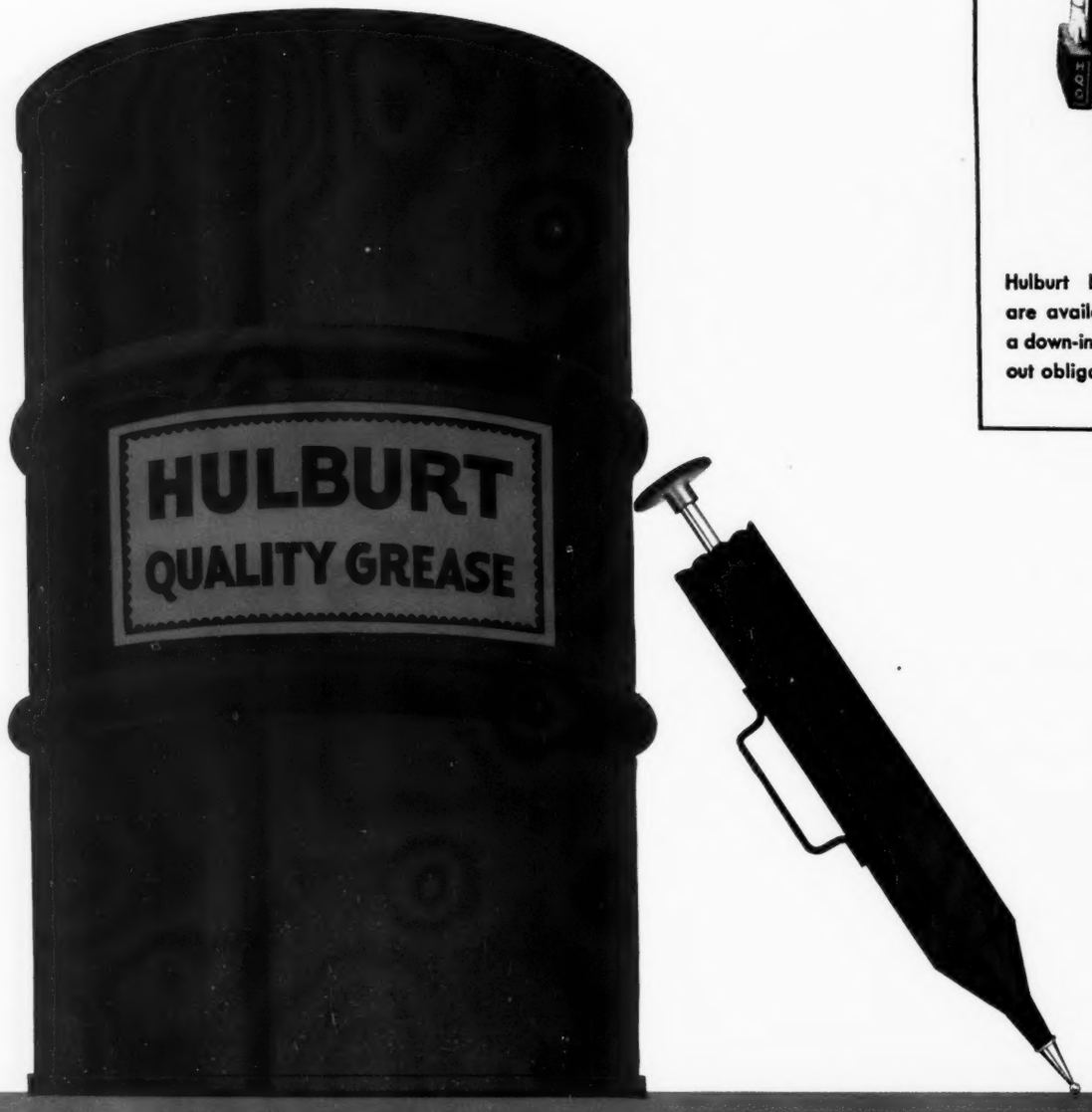
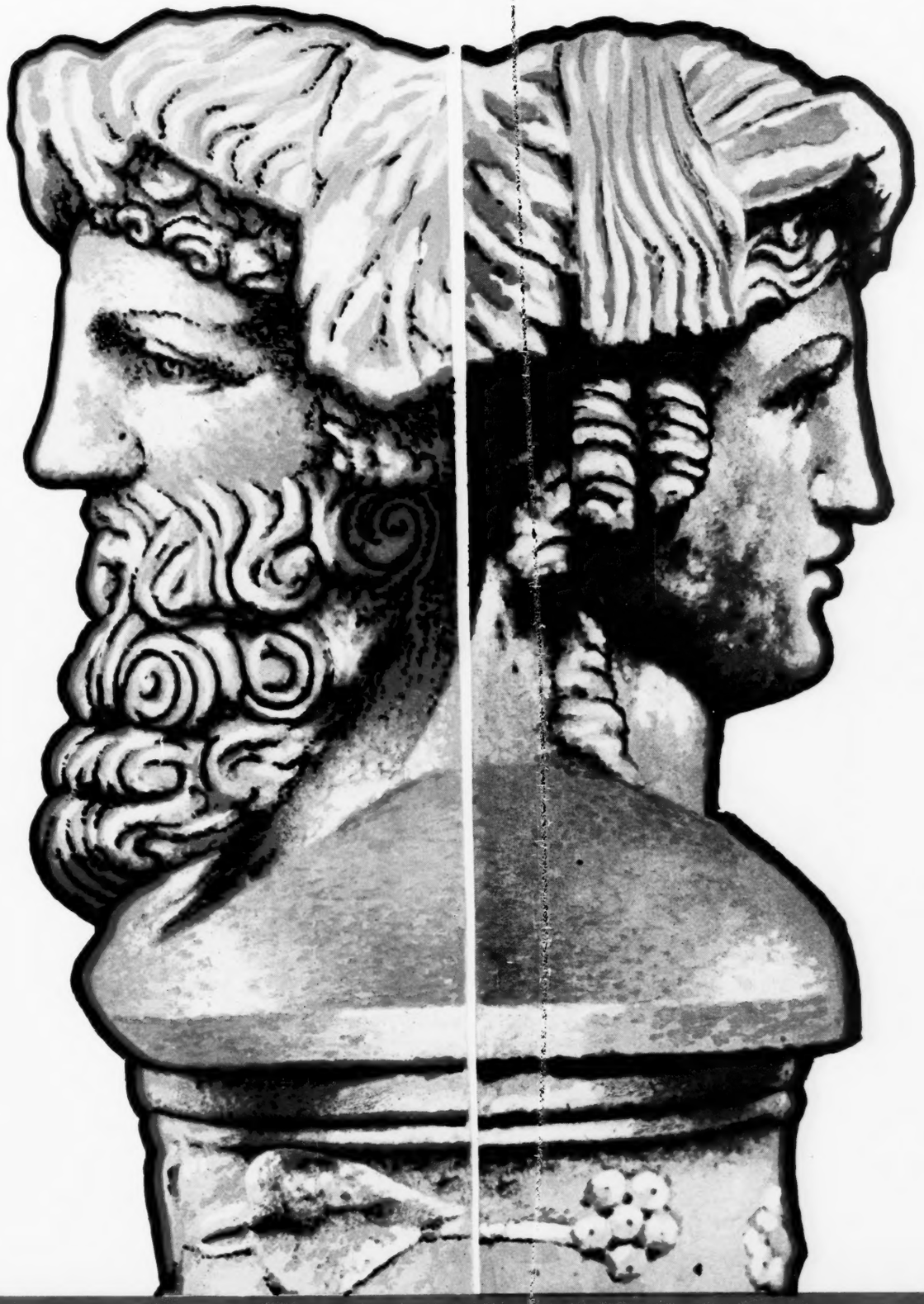
Hulburt Lubrication Engineers are available at all times for a down-in-the-mine survey without obligation. Write us Today.

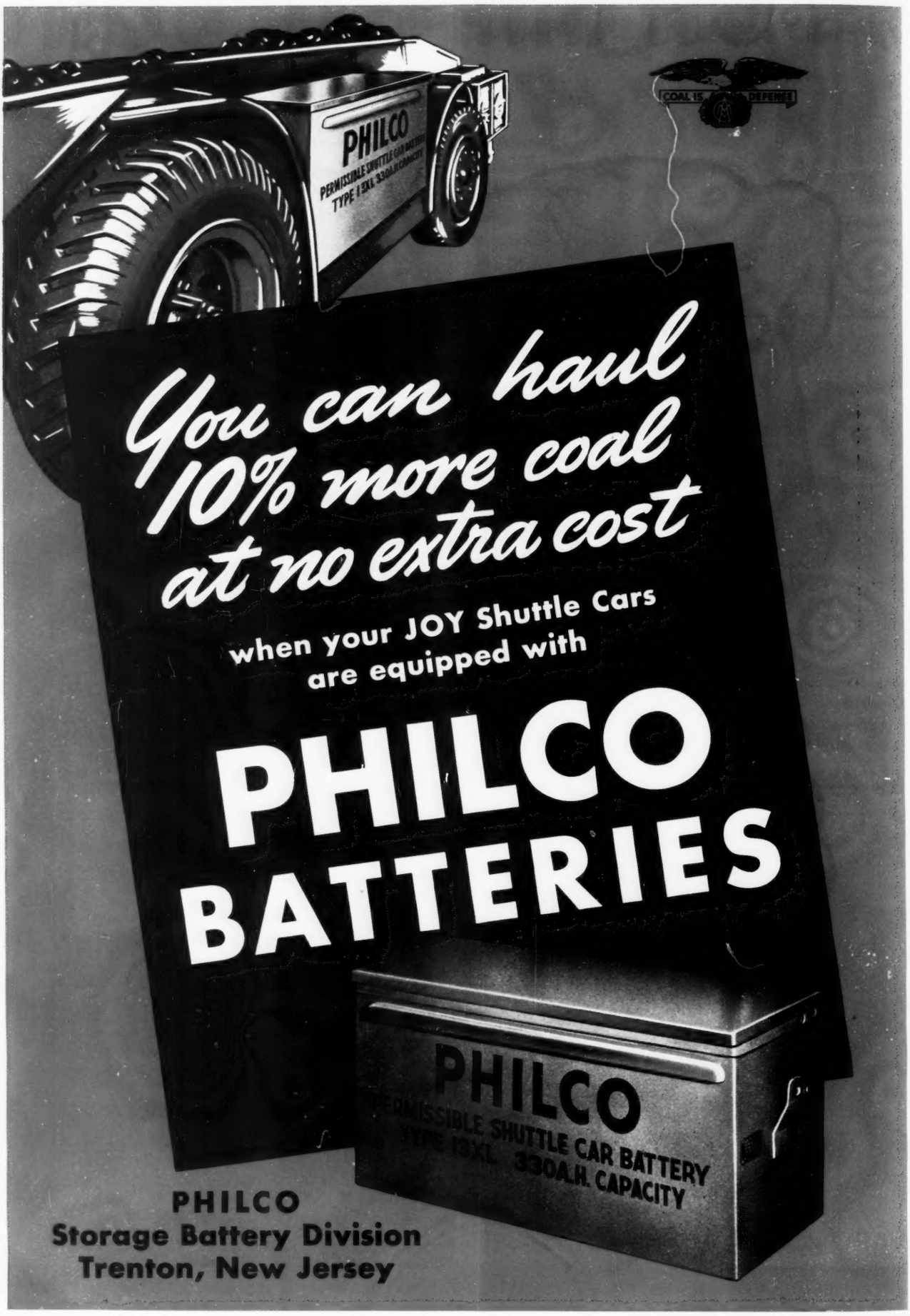



HULBURT

-IT'S **OK** WITH **HULBURT!**



**QUALITY GREASE**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COAL IS DEFENSE
You can haul 10% more coal at no extra cost
when your JOY Shuttle Cars are equipped with
PHILCO BATTERIES
PHILCO
PERMISSIBLE SHUTTLE CAR BATTERY
330A.H. CAPACITY
PHILCO
Storage Battery Division
Trenton, New Jersey

JANUARY 1942 Thirty-Five Cents Per Copy

# Coal Age

Volume 47 Number 1

War now dominates the American scene and ways and means of quickly carrying it to its inevitable victory for the United States is the big problem of the day. What industry must do, therefore, is the subject of a significant message by James H. McGraw Jr., head of the McGraw-Hill Publishing Co., on pp. 37 and 38 of this issue. The particular problem of the coal industry, growing out of the need for more tonnage, is summarized on p. 39. . . . **More** is to come on this question—and soon. Along with its summary of developments on the coal front in 1941, the February annual review issue will be devoted to a detailed statement of things the industry can do to help the war effort along, supplemented by a survey of latest developments in Washington on regulations which may be necessitated by war conditions, the problem of obtaining materials and supplies and other factors affecting the economic and operating picture in the coal industry. . . . **Still more** is the goal for future issues, which will continue to present material designed to promote efficiency and keep the industry producing at the required rate,

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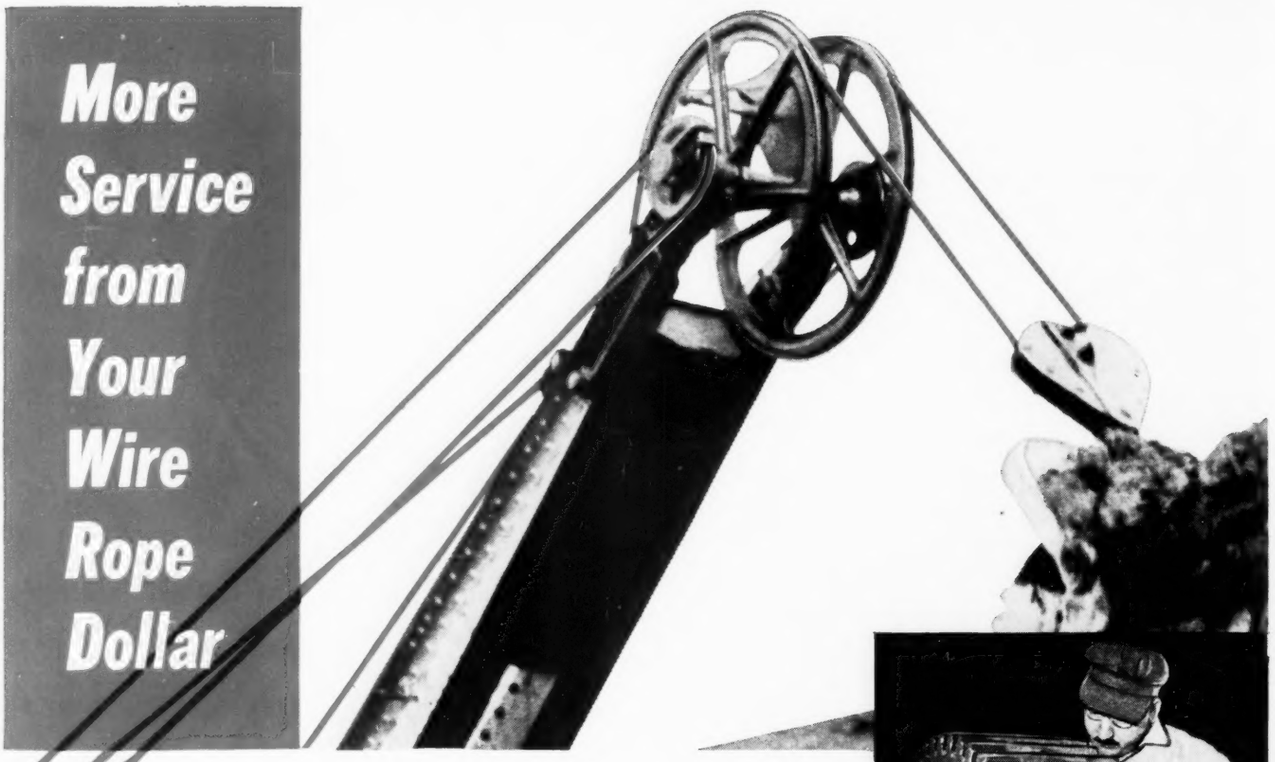
# More Service from Your Wire Rope Dollar



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**Texaco Crater clings to gear teeth, cushioning load shocks, preventing metal-to-metal contact, deadening the noise. Doesn't channel, ball up, or throw off.**

## Protection Against Wear and Weather

THIS is no time to have to replace wire rope because of undue wear, rust or corrosion. Today, with the scarcity of materials, every productive hour counts double.

You can get longer service from your wire rope by protecting it with *Texaco Crater.*

*Texaco Crater* penetrates to the core, coating each individual wire of each strand with a highly viscous film that protects against wear, rust and corrosion.

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★ More locomotives and cars in the U. S. are lubricated with Texaco than with any other brand.

★ More revenue airline miles in the U. S. are flown with Texaco than with any other brand.

★ More buses, more bus lines and more bus-miles are lubricated with Texaco than with any other brand.

★ More stationary Diesel horsepower in the U. S. is lubricated with Texaco than with any other brand.

★ More Diesel horsepower on streamlined trains in the U. S. is lubricated with Texaco than with all other brands combined.

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**FRED ALLEN** every Wednesday night. See your local newspaper for time and station.

**METROPOLITAN OPERA.** Complete broadcasts of great operas every Saturday. See your local newspaper for time and station.

TEXACO

# TEXACO Lubricants and Fuels

## FOR THE COAL MINING INDUSTRY

RETURN METAL DRUMS PROMPTLY . . . thus helping to make present supply meet industry's needs and releasing metal for National Defense.

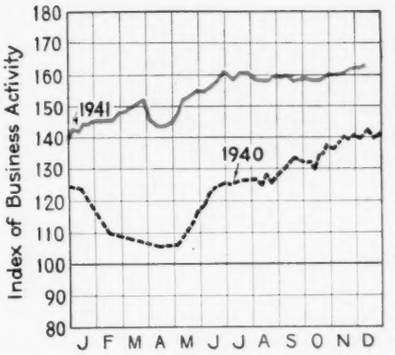
(CONTINUED FROM PAGE 5)

supplemented by special features arising out of the war effort. Among those things promoting efficiency and raising productive capacity is mechanical mining. How Peerless mine, in Indiana, stepped up loader output 75 tons per shift by big cars and a transfer station therefor is scheduled for an early issue. Mechanical mining also takes its rightful place in this issue with articles on developments in the Elkhorn seam (p. 44) and on methods at Ingle Coal Co's. new Ditney Hill mine on p. 52. . . . **Mines need power,** however, and power in turn must be controlled. How the Sterling Coal Co. solved the question of picking up heavy dead loads after circuit-breaker interruptions by reducing voltage at the generators with special control and circuit-breaker equipment is the subject of a significant article by John M. Rairigh (p. 41). Electrical men will find it well worth perusal. . . . **Transportation** is a necessary step in getting out the coal, and cars are the necessary medium in most cases. This poses the problem of keeping them going at the least cost, which The Hudson Coal Co. has solved by building special repair shops with a complete complement of the right tools. For the details, see p. 47. . . . **Safety** rounds out the feature section, with five meeting reports from Indiana, Kentucky and Pennsylvania, in addition to latest developments in the industry and in Washington, lending sparkle to the news section.

# HOW'S BUSINESS

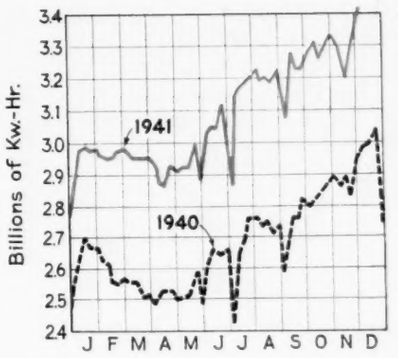
### GENERAL BUSINESS CONDITIONS

Change-over to an all-out war economy is proceeding briskly. From now on, business will move in two directions at once: Production and distribution associated with the war effort will expand, whereas output of goods that do not directly enhance the country's military strength and that consume critical materials will be curtailed. *Business Week* Index (Dec. 20) stood at 164.8, compared with 159.7 five weeks before and 143.0 a year previous.



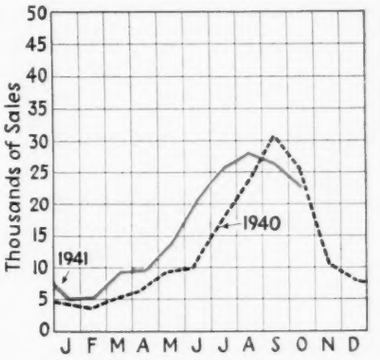

### ELECTRIC POWER OUTPUT

Output of energy by the electric light and power industry hit an all-time peak during the week ended Dec. 13, when 3,431,328,000 kw.-hr. was consumed, an increase of 427,785,000 kw.-hr., or 14.2 per cent, over the corresponding week a year ago. Figures for other recent weeks, according to the Edison Electric Institute, are: Nov. 15, 3,304,000,000 kw.-hr.; Nov. 22, 3,205,000,000; Nov. 29, 3,293,000,000; Dec. 6, 3,431,000,000 kw.-hr.



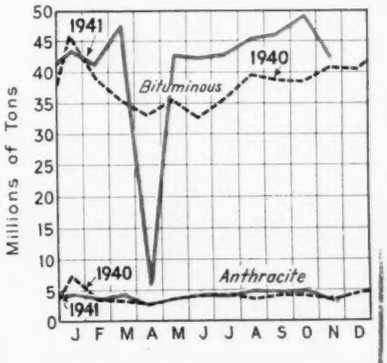

### COAL STOKER SALES

Mechanical stoker sales in the United States in October last totaled 23,289 units (U. S. Bureau of the Census from 101 manufacturers), compared with 27,138 in the preceding month and 26,025 in October, 1940. Sales of small units in October last were: Class 1 (under 61 lb. of coal per hour), 21,034 (bituminous, 18,467; anthracite, 2,567); Class 2 (61,100 lb. per hour), 1,062 (bituminous, 980; anthracite, 82); Class 3 (101–300 lb. per hour), 792.




### COAL PRODUCTION

Bituminous coal produced by United States coal mines in November last (preliminary) totaled 42,865,000 net tons, according to the Bituminous Coal Division, U. S. Department of the Interior. This compares with 49,800,000 ton in the preceding month and 40,012,000 tons in November, 1940. Anthracite tonnage in November last, according to the U. S. Bureau of Mines (preliminary), was 3,832,000, against 5,380,000 (revised) in the preceding month and 3,980,000 tons in November, 1940.



# 9 Ways

## *to Get the Most from your Explosives —and Cooperate in the Emergency*

Today it is imperative that all materials be used to full advantage —with effectiveness and with economy.

All industry's real obligation is now:

***To do everything possible in the national emergency . . .***

***To continue making the best product it can . . .***

***To cooperate fully with customers and suppliers to achieve more efficient use***

Examples of such cooperation are the nine Atlas advertisements which have appeared during the past two years—suggestions for loading, cutting, drilling, stemming, etc.—suggestions that should promote better use of existing equipment and materials.

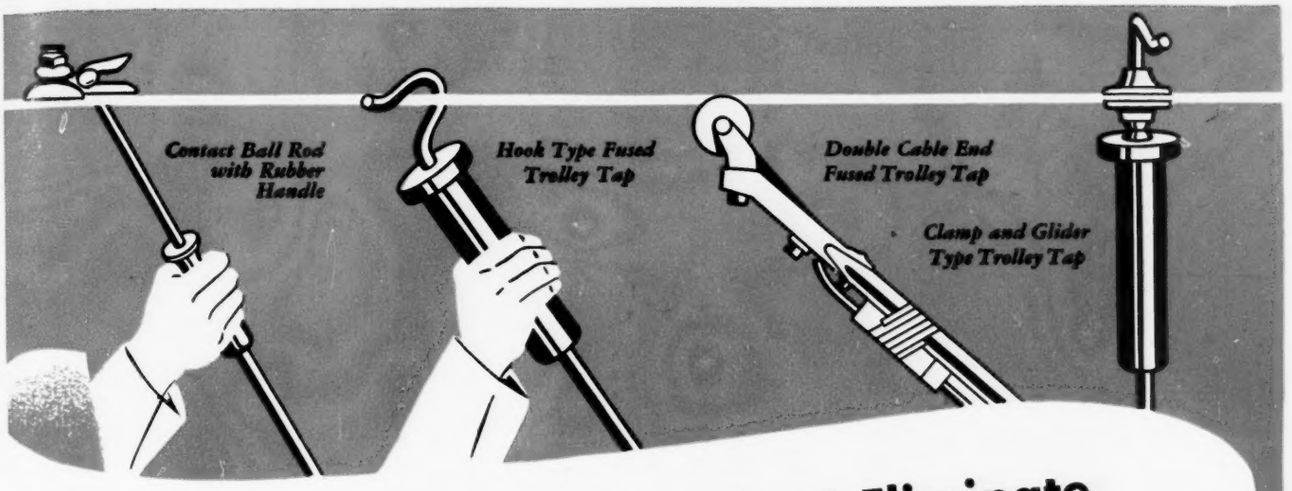
These nine advertisements are but an indication of the service Atlas stands ready to give. In these days Atlas urges your cooperation to carry out our common duty.

We will be glad to supply copies of the complete series.

**ATLAS** EXPLOSIVES *"Everything for Blasting"*

CHEMICALS ATLAS EXPLOSIVES

**ATLAS POWDER COMPANY, Wilmington, Del. • Offices in principal cities • Cable Address—Atpowco**


Contact Ball Rod with Rubber Handle
Hook Type Fused Trolley Tap
Double Cable End Fused Trolley Tap
Clamp and Glider Type Trolley Tap

## Stop abusive overloading! Eliminate costly cable and motor burnouts! Safeguard your production and your equipment with

# O-B Fused Trolley Taps!

O-B Fused Trolley Taps are available in two sizes, the Form G Tap, accommodating fuses from 30 to 400 amperes and the Form 5 Junior Tap, accommodating fuses from 3 to 30 amperes.

The Form G Tap is available in Hook Type, Clamp and Glider Type, Double Cable End Type and Contact Ball Rod Type (a variation of the Hook Type). Form 5 Junior Taps are available in the Hook Type and the Double Cable End Type. See your O-B Catalog No. 22, pages 84 and 85 for complete descriptions and listings of fused trolley taps and fuses as well as ground clamps for making return circuit and safety ground connections.

ARE DOLLARS waiting on dimes at your operation? Are you jeopardizing the production of your mine—the performance of your mechanized investment—by failing to provide adequate overload protection? Why take chances? A few dollars invested in a simple, positive O-B Fused Trolley Tap protection program will insure production and safeguard that big investment in face machinery motors, locomotives and trailing cables. Ask your O-B representative or write today for more information on O-B Fused Trolley Tap Protection!

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MANSFIELD OHIO · U · S · A

Canadian Ohio Brass Company, Ltd. Niagara Falls, Ont., Canada

***COMPLETE O-B PROTECTION FOR CONTINUOUS PRODUCTION***

# New Service Life for Old Mine Cars

We are already doing a good job on a production basis in these most trying times. • • • However, we can also be of assistance to you, if you have old cars that require rebuilding, or if you need new cars. • • • We can supply wheels quite promptly; and all other parts, such as complete trucks, axles, bumpers, electrically welded end sill construction with spring bumpers, or complete cars, just as quickly as materials can be obtained. • • • If you need parts, or complete cars, place your order now.

**AMERICAN CAR AND FOUNDRY COMPANY**

New York • St. Louis • Chicago • Philadelphia • Berwick, Pa. • Pittsburgh • Cleveland • Huntington, W.Va.

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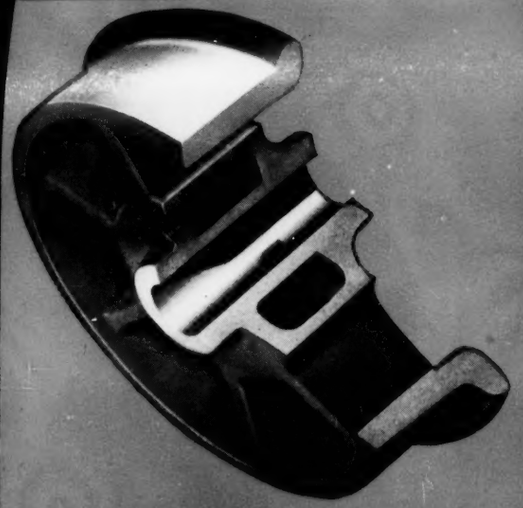
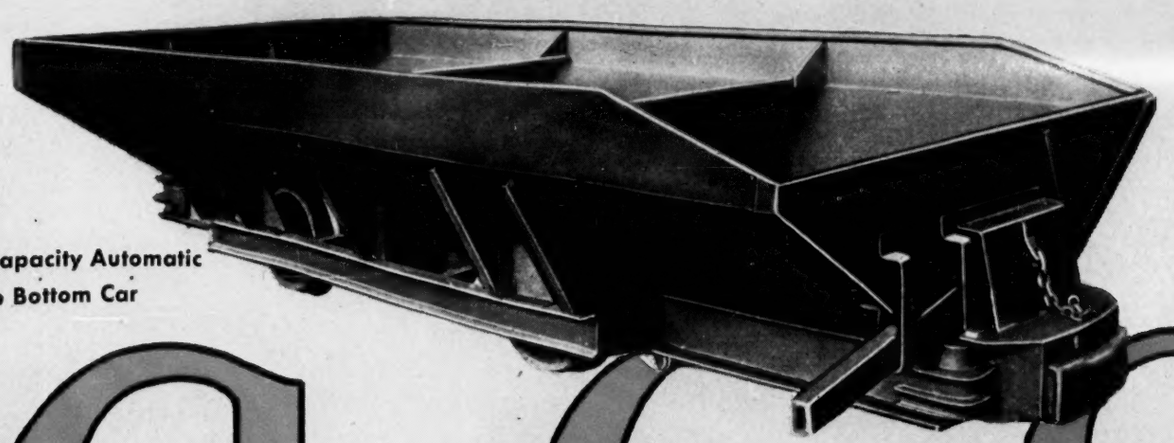
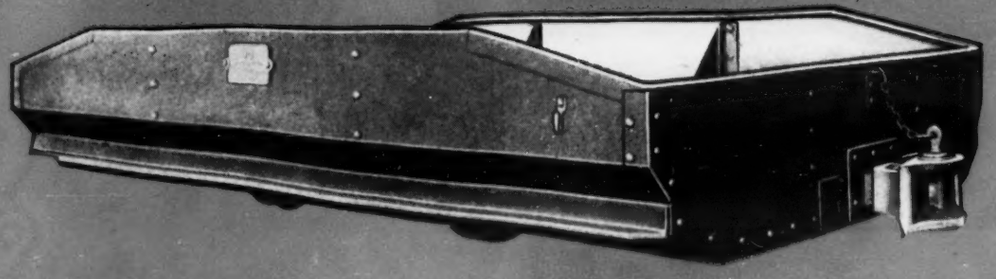


a.C.f. Wheels are made by our heat-treating process of manufacture, of special mixture of metals — better than steel and better than iron alone for mine car wheels.

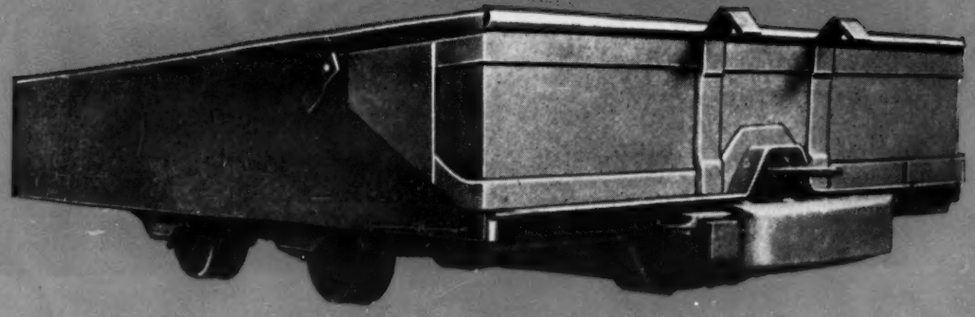


Large Capacity Automatic Drop Bottom Car

# a.C.f.



Car for Rotary Dump



Electrically Welded End Dump Car

"...LET US STRIVE ON TO FINISH THE WORK WE ARE IN; TO BIND UP THE NATION'S WOUNDS; TO CARE FOR HIM WHO SHALL HAVE BORNE THE BATTLE, AND FOR HIS WIDOW AND FOR HIS ORPHAN; TO DO ALL WHICH MAY ACHIEVE AND CHERISH A JUST AND LASTING PEACE AMONG OURSELVES AND WITH ALL NATIONS."

•

*Reprints of this picture, suitable for framing, will be furnished without charge upon request on your company letterhead.*

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*designers, manufacturers and erectors of complete plants and machinery for bulk materials handling.*

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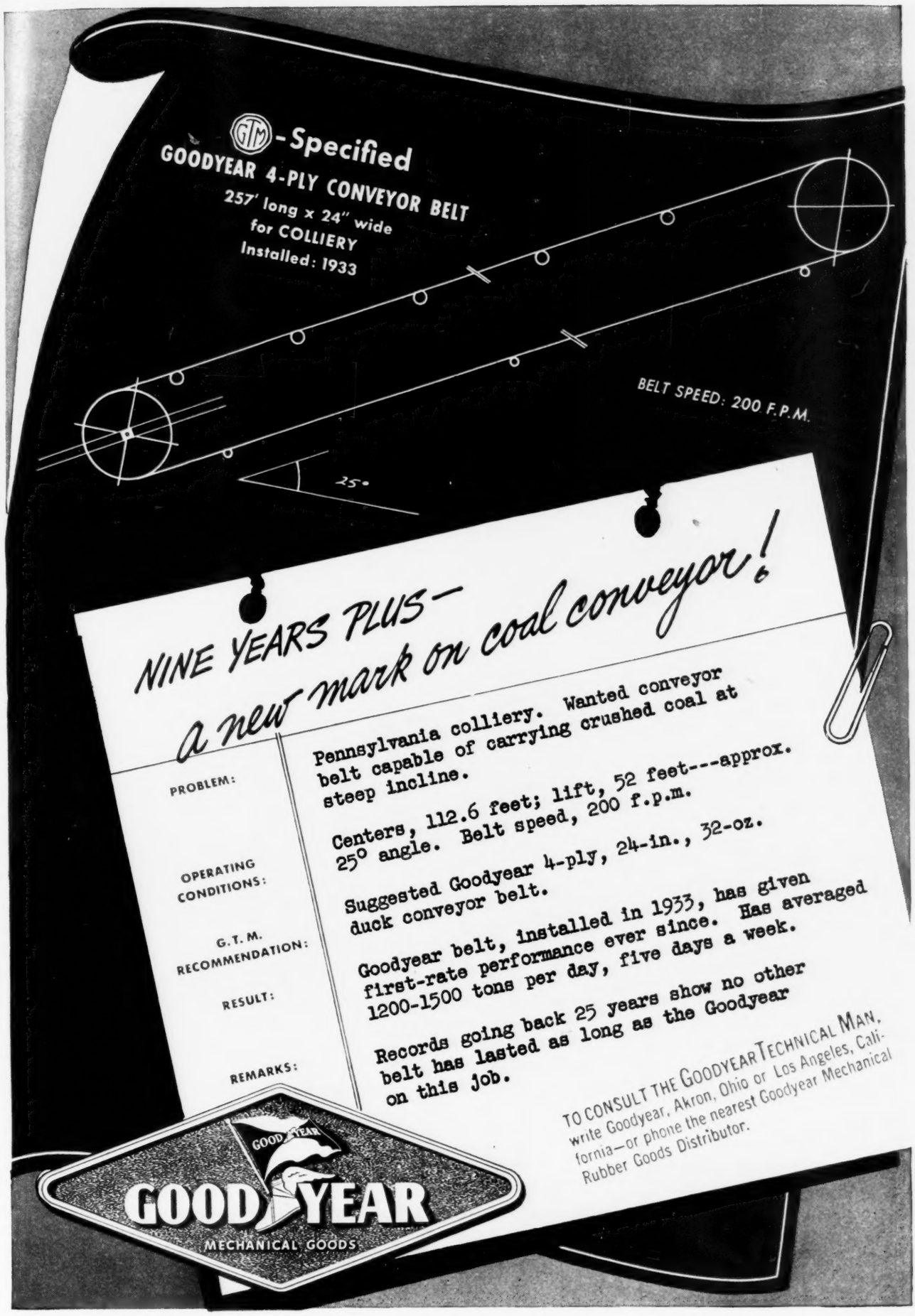
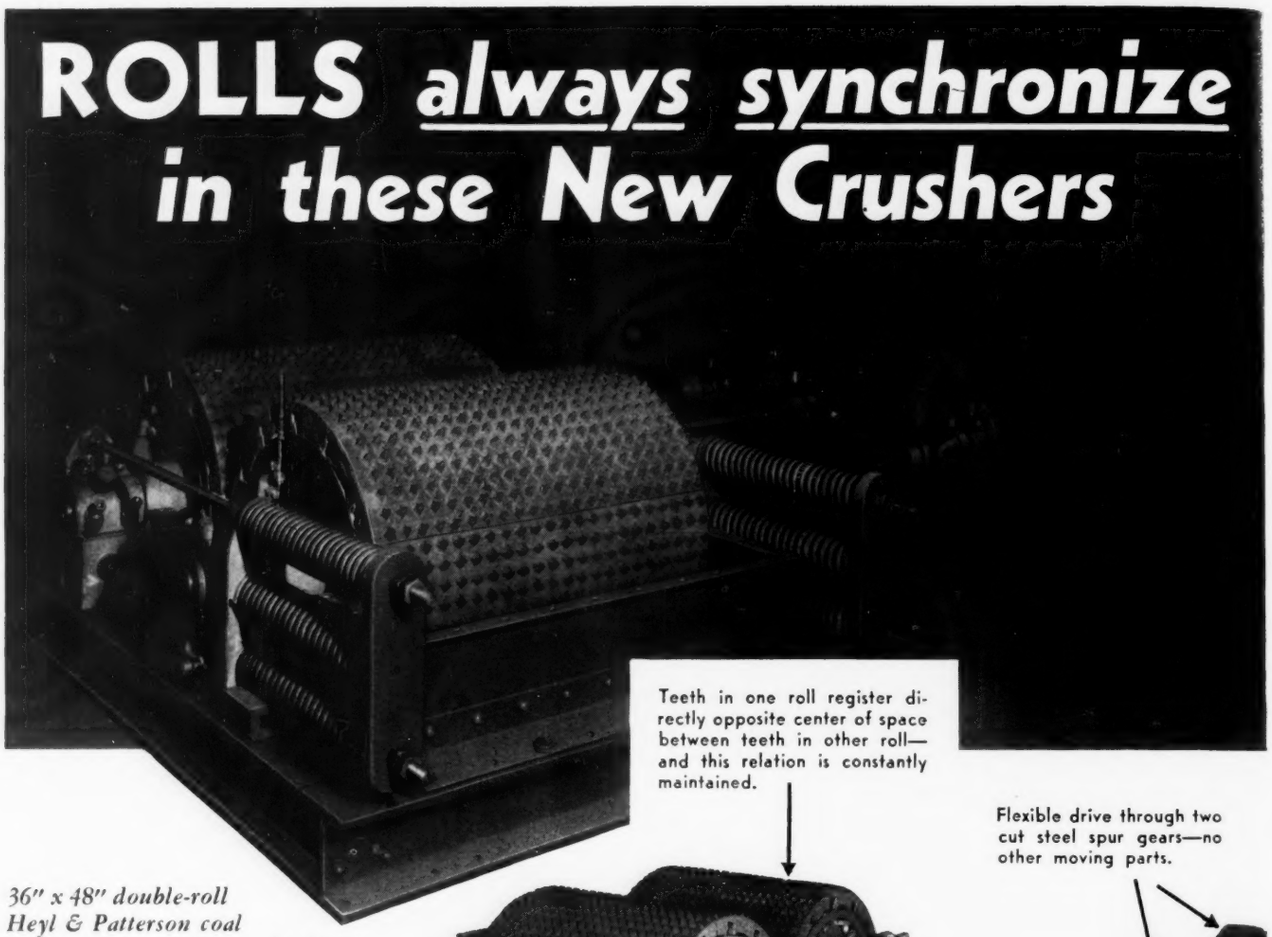
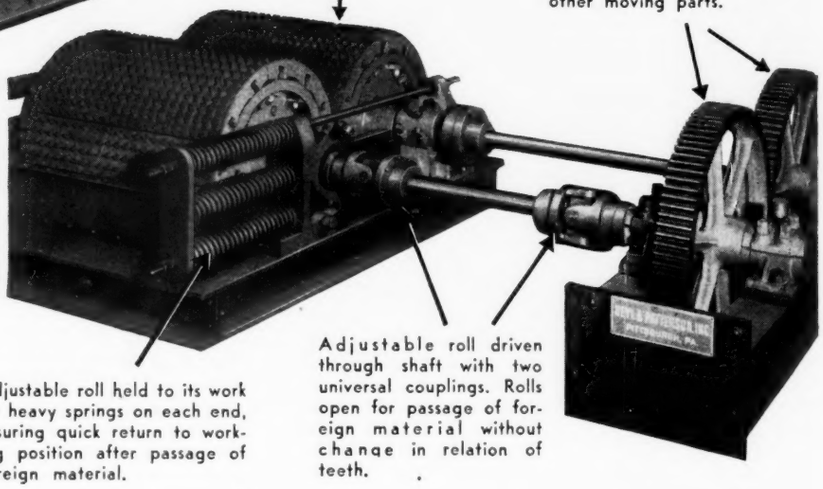

GTM-Specified
GOODYEAR 4-PLY CONVEYOR BELT
257' long x 24" wide
for COLLIERY
Installed: 1933
BELT SPEED: 200 F.P.M.
25°
NINE YEARS PLUS—
a new mark on coal conveyor!
PROBLEM:
Pennsylvania colliery. Wanted conveyor belt capable of carrying crushed coal at steep incline.
OPERATING CONDITIONS:
Centers, 112.6 feet; lift, 52 feet---approx. 25° angle. Belt speed, 200 f.p.m.
G. T. M. RECOMMENDATION:
Suggested Goodyear 4-ply, 24-in., 32-oz. duck conveyor belt.
RESULT:
Goodyear belt, installed in 1933, has given first-rate performance ever since. Has averaged 1200-1500 tons per day, five days a week.
REMARKS:
Records going back 25 years show no other belt has lasted as long as the Goodyear on this job.
TO CONSULT THE GOODYEAR TECHNICAL MAN, write Goodyear, Akron, Ohio or Los Angeles, California—or phone the nearest Goodyear Mechanical Rubber Goods Distributor.
GOODYEAR
MECHANICAL GOODS

# ROLLS *always synchronize* in these New Crushers



*36" x 48" double-roll Heyl & Patterson coal crusher with synchronized rolls. (Housing not shown.)*

*Crusher reduces 120 tons of plus 2-inch coal per hour to minus 3/4-inch, or any size between 2-inch and 3/4-inch, with minimum of over- and undersize.*


Teeth in one roll register directly opposite center of space between teeth in other roll—and this relation is constantly maintained.
Flexible drive through two cut steel spur gears—no other moving parts.
Adjustable roll held to its work by heavy springs on each end, assuring quick return to working position after passage of foreign material.
Adjustable roll driven through shaft with two universal couplings. Rolls open for passage of foreign material without change in relation of teeth.

Recently, several installations of coal crushers have been made by Heyl & Patterson which embody outstanding new features that assure uniform crushed coal sizes over a reasonably wide range, with a minimum of oversize and undersize.

In addition to having the required operating characteristics, these crushers are sturdy in construction, positive in action and low in maintenance.

Our engineers will be glad to consult with you regarding crushers designed to fit your particular requirements.

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FOR THE
**COAL INDUSTRY**

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ROTARY DUMPS - CRUSHERS
CONVEYORS - REFUSE CARS
CAR HAULS and RETARDERS
BOAT LOADING and UNLOADING PLANTS
RAILROAD and MINE CAR DUMPERS

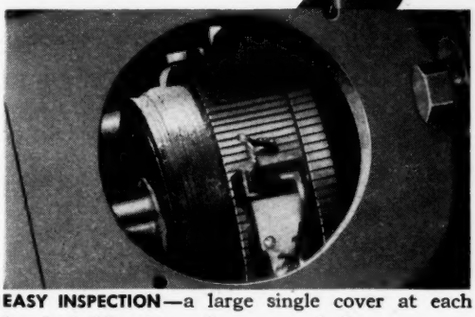
**HEYL & PATTERSON INC.**
50 WATER STREET PITTSBURGH, PA.

# *Here's Why* Westinghouse Explosion-Tested "SK" Mine Motors

## • GIVE PERFECT COOLING

## • CARRY HEAVY LOADS WITH REDUCED STRESS

LOAD CLOSE TO BEARING—reduces stresses on shaft and bearing to a minimum.
DOUBLE WALLED END BRACKET—permits free passage of large volumes of cooling air over practically the entire motor.
APPROVED BY U.S. BUREAU OF MINES—motor meets requirements and has passed tests for use on machinery where U.S. Bureau of Mines requirements have been met.
FAN ON COMMUTATOR END OF SHAFT—where pulleys, pinions, guards, or driven machine cannot interfere with flow of cooling air.



**EASY INSPECTION**—a large single cover at each brush holder is easily removed for access to commutator and brushes.

**Standardization of "SK" Wearing Parts Cuts Cost of Replacements**

"SK" wearing parts have been held to the same essential dimensions for 29 years. Not only will the latest design of parts fit every "SK" explosion-tested motor, no matter how old, but many are interchangeable with parts for standard open type "SK" motors.

Look inside of this Westinghouse explosion-tested mine motor and you'll see why it gives safe, low-cost operation in underground service.

Note that the fan is on the commutator end of the motor—a Westinghouse feature that results in thorough, unrestricted motor ventilation and reduced stresses on shaft and bearing because the load can be placed close to the bearing.

Note, too, that brushes and commutator are completely enclosed for safety—yet easily reached through large covers placed opposite each brush holder.

And finally, don't overlook the time-tested "SK" features of—a rugged rolled steel frame—forged steel feet, welded to the frame—and a large, mica-insulated commutator that gives good commutation even on severe overloads.

For complete information on this motor built especially for mining service, write or call your Westinghouse representative today.

WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY
EAST PITTSBURGH, PA.

J-21085

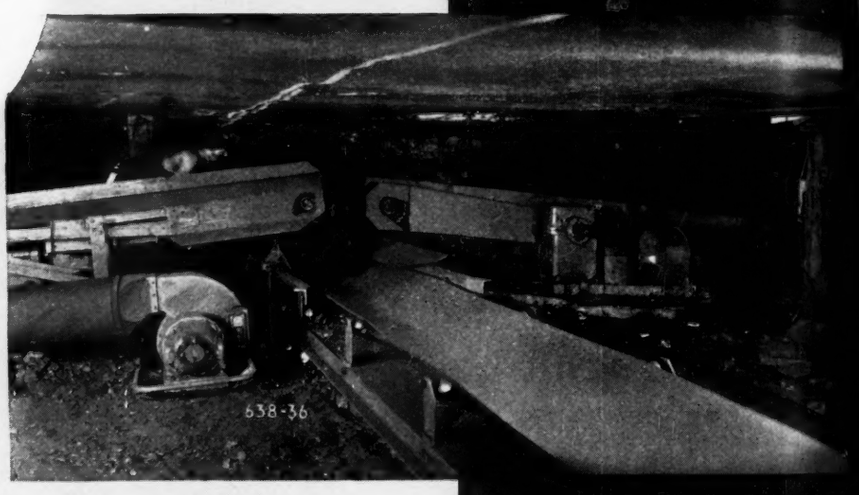
**Westinghouse SK Mining Motors**

# GRADES—LOW VOLTAGE—WET PLACES?

## USE

# JEFFREY

## CONVEYORS

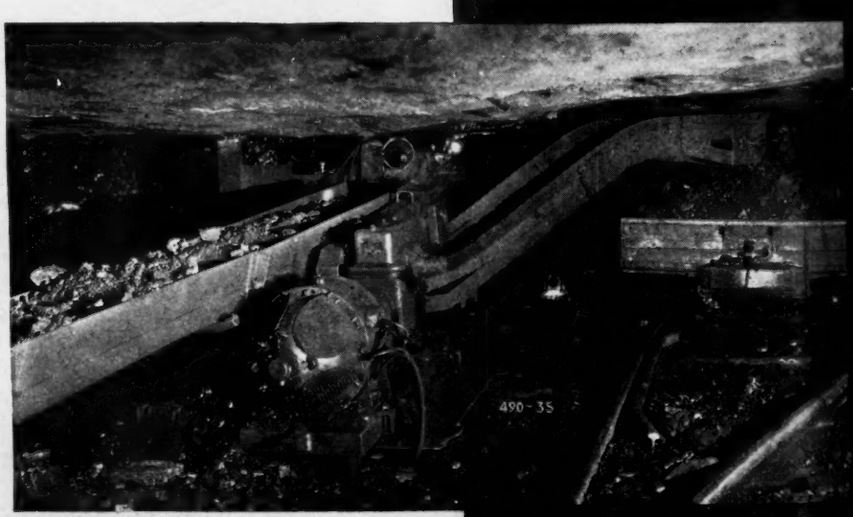


Jeffrey conveyors are positive in their motion—operate uphill or downhill—in wet or dry coal—rolling bottom—low voltage . . . and are reversible for carrying supplies to face.

17 standard units from which
54 combinations of both chain and belt types can be made
Adaptable to any or all mining conditions
Rugged construction
Provide steady flow of coal

The specialized experience our Jeffrey engineers has prompted many refinements in design, construction and application . . . reflected in low cost per ton.

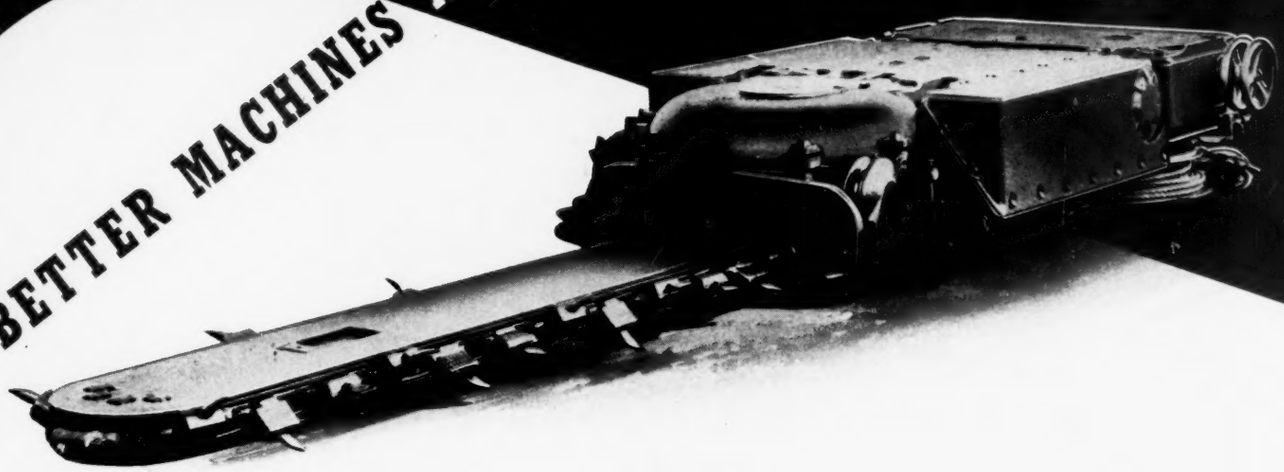
Catalog No. 740



THE JEFFREY MANUFA
[illegible] North Fourth Street

Service Stations: [illegible] Pittsburgh, Harlan, Ky. [illegible]

NO BETTER MACHINES ARE BUILT

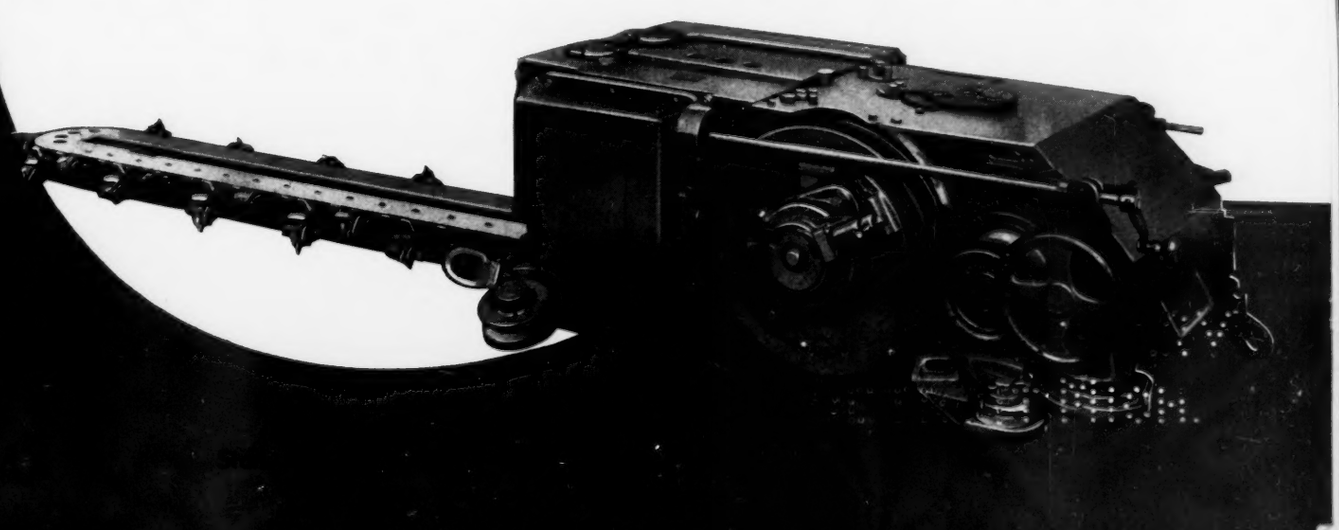


# THAN JEFFREY 35 SERIES SHORTWALLS

Time-tested cutters of simple, rugged, dependable design — few slow-moving parts — slow-speed motor — sturdy electrical control . . . that's the mighty "35" series shortwalls. With the inescapable requirements of reliable performance and low maintenance cost, these machines will give you the lowest cost per ton with safety . . . the most for your money. Eight types including five for conveyor mining. A machine for every condition.

**THE JEFFREY MANUFACTURING COMPANY**

912-99 NORTH FOURTH STREET . . . COLUMBUS, OHIO



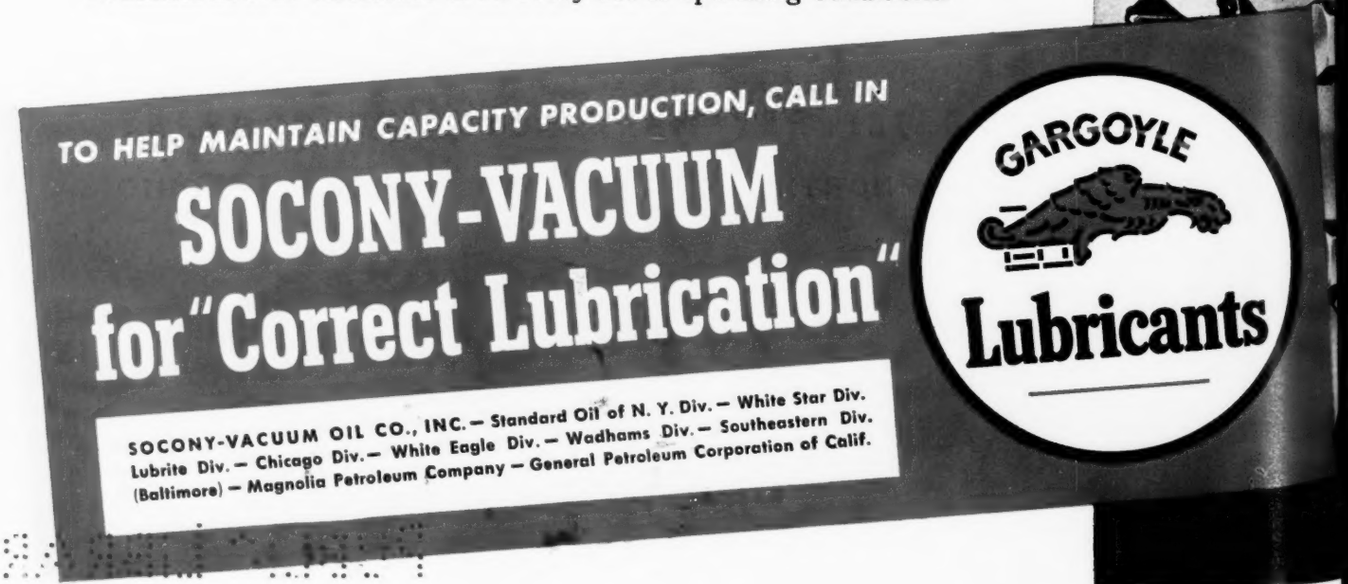
# Painting a "Cushion" on Open Gears

## THE "CORRECT" ANSWER TO AN IMPORTANT PROBLEM IN VITAL DEFENSE PRODUCTION

*Problem:* The open gears at the right must be protected by a lubricant against wear due to: (1) Heavy or shock loads, (2) Dust and dirt in the air, (3) Presence of water.

The *correct* lubricant for this job must provide: (1) A tough film to prevent metal-to-metal contact, (2) A thin film to prevent accumulation of abrasives and packing of clearances, (3) A tough "waterproof" coating.

*Answer:* We have created a unique lubricant for this job — *Gargoyle Viscolite Fluid.* It can be applied by hand without heating, or be fed by mechanical devices. It is made with a quick-drying, non-inflammable diluent. As the diluent evaporates, a tough, black, thin skin is formed. *This film won't squeeze out or throw off!* As the film is thin, there is no opportunity to hold or pack dirt and dust. The tough coating sheds water like a duck. In many cases, Gargoyle Viscolite Fluid has helped reduce consumption more than 50%. This lubricant is available in four viscosities to fit every set of operating conditions.


TO HELP MAINTAIN CAPACITY PRODUCTION, CALL IN
SOCONY-VACUUM
for "Correct Lubrication"
SOCONY-VACUUM OIL CO., INC. — Standard Oil of N. Y. Div. — White Star Div. Lubrite Div. — Chicago Div. — White Eagle Div. — Wadhams Div. — Southeastern Div. (Baltimore) — Magnolia Petroleum Company — General Petroleum Corporation of Calif.
GARGOYLE
Lubricants

GARGOYLE VISCOLITE FLUID IS APPLIED IN LIQUID FORM. NO PRE-HEATING IS NECESSARY.
THIS UNIQUE LUBRICANT DRIES QUICKLY – LEAVING A TOUGH, BLACK SKIN TO CUSHION SHOCK LOADS.

● Bursting through that snow drift at the right, is a Walter Tractor Truck, equipped with giant snow plows. Highway Departments throughout the snow belt of America and Canada have learned from experience that Walter 4-Point Positive Drive provides the most dependable power-plus-traction to keep going through snow blocked roads and over icy surfaces.

# Heavy Snows Can't Stop WALTER TRACTOR TRUCKS!

## 4-POINT POSITIVE DRIVE *provides* EXTRA TRACTION *for Winter Coal Hauling*

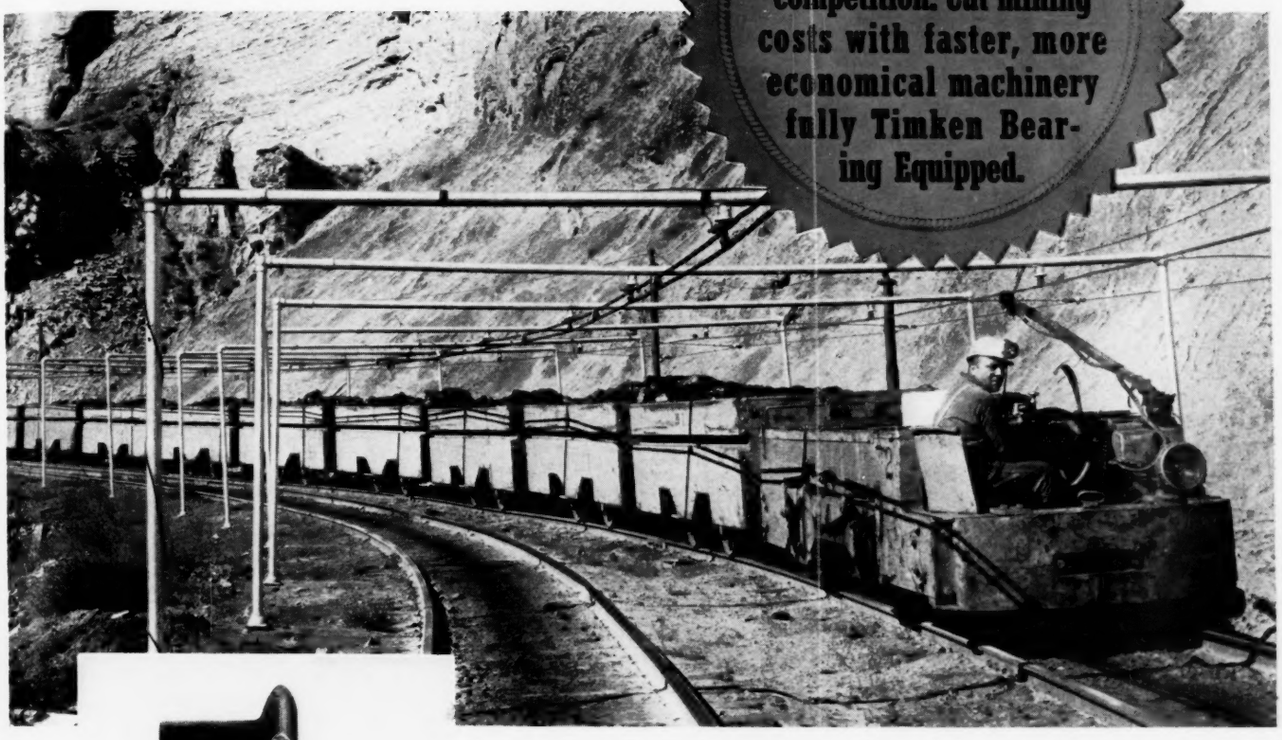
It's mighty costly—and unnecessary—to have your hauling from mine to tipple tied up every time there's a heavy snowfall. WALTER TRACTOR TRUCKS will keep your coal moving through snow, ice, mud and other running conditions that stop anything else on wheels.

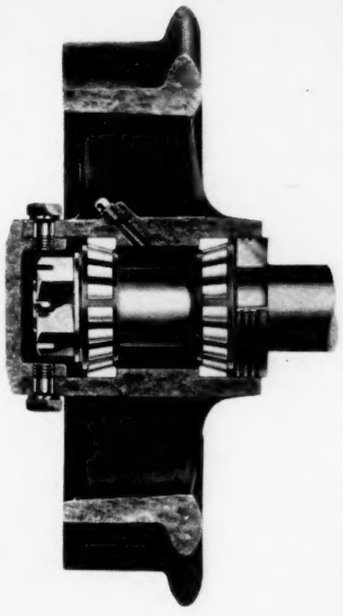
Walter 4-Point Positive Drive gives you FOUR powerful driving wheels, with positive traction in each. Patented Lock Differentials automatically proportion the torque to each wheel according to its traction, giving you a constant source of driving power, even if one, two or three wheels meet slippery surfaces.

Coupled with this feature, are other advantages such as Suspended Double Reduction Drive—powerful, fully rated motor—14-to-1 Range Transmission— scientific weight distribution—and rugged construction that stands up under maximum loading and running. Learn more about these important benefits of WALTER TRACTOR TRUCKS. Write today for detailed literature.

**WALTER MOTOR TRUCK CO.**
1001-19 IRVING AVENUE, RIDGEWOOD, QUEENS, L. I., N. Y.

**LOOK AHEAD!**
**After defense-severe competition. Cut mining costs with faster, more economical machinery fully Timken Bearing Equipped.**





Timken Bearing application for mine car wheels. Over 350,000 mine cars have gone on Timken Roller Bearings in more than 1,000 mines during the last 22 years. They have saved tremendous sums of money for their users — in time, maintenance and material.

Mine cars, loaders, conveyors, hoists, crushers and screens equipped with Timken Bearings are strong factors of increased coal production for defense. The photograph shows a trip of Timken Bearing Equipped cars at the Independent Coal & Coke Company, Kenilworth, Utah.

In view of future uncertainty, mine operators and equipment manufacturers should be considering changed conditions and how to meet them. One of the surest ways to give mining machinery extra speed, greater economy of operation and lower maintenance is to apply Timken Tapered Roller Bearings at *every* point of friction and hard service.

**THE TIMKEN ROLLER BEARING COMPANY, CANTON, OHIO**

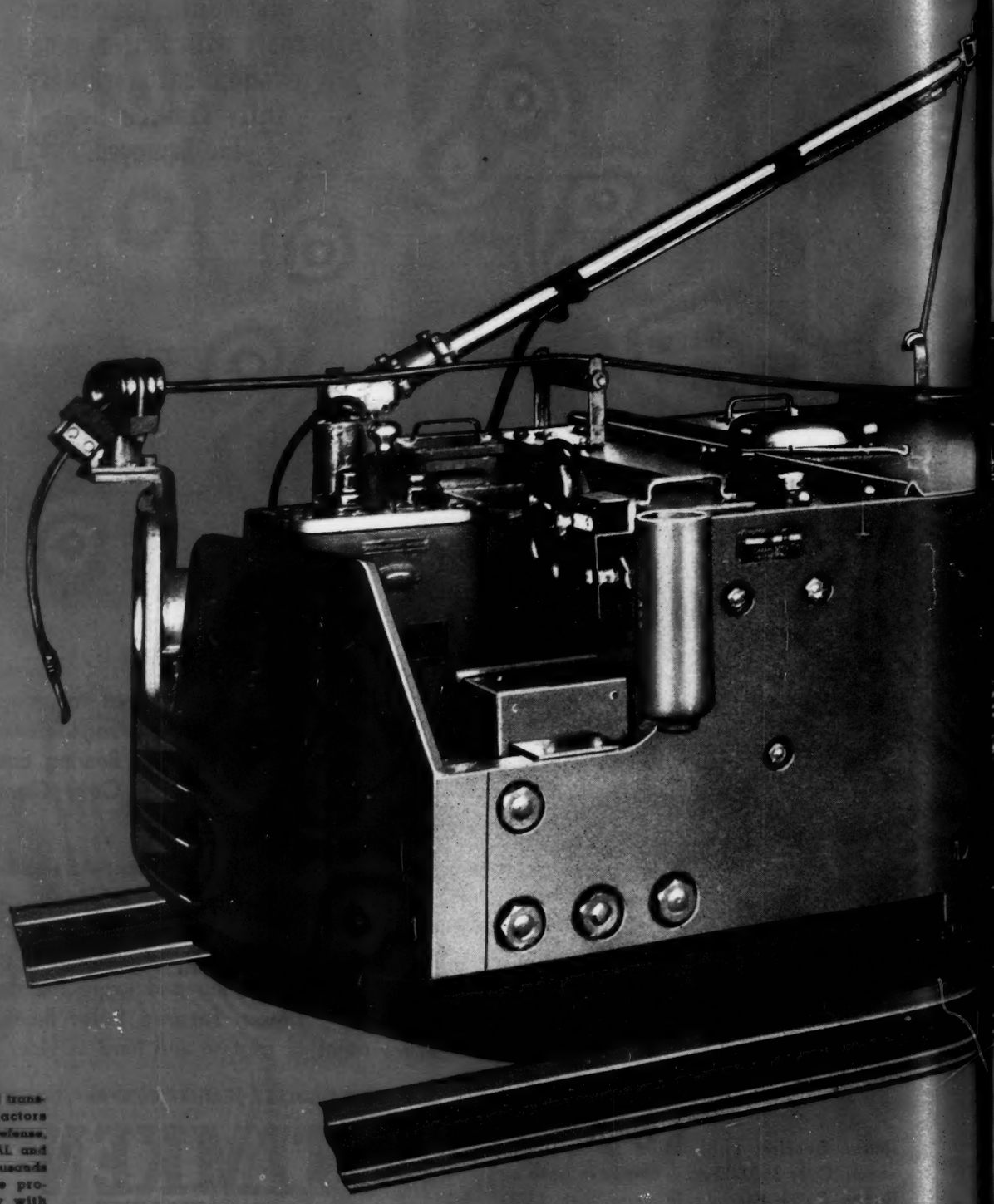
**TIMKEN**

TRADE-MARK REG. U. S. PAT. OFF.

***TAPERED ROLLER BEARINGS***

Manufacturers of Timken Tapered Roller Bearings for automobiles, motor trucks, railroad cars and locomotives and all kinds of industrial machinery; Timken Alloy Steels and Carbon and Alloy Seamless Tubing; and Timken Rock Bits.

# *For Extra Performance . . .*



Industry and transport, vital factors in National Defense, demand COAL and METALS. Thousands of tons are produced daily with Goodman mining machinery.

**GOODMAN MANUFACTURING COMPANY**

# . . . GOODMAN LOCOMOTIVES

Whether it be for gathering service or haulage work, each Goodman locomotive of the complete line of storage battery, trolley and combination types is built to suit the specifications of the purchaser.

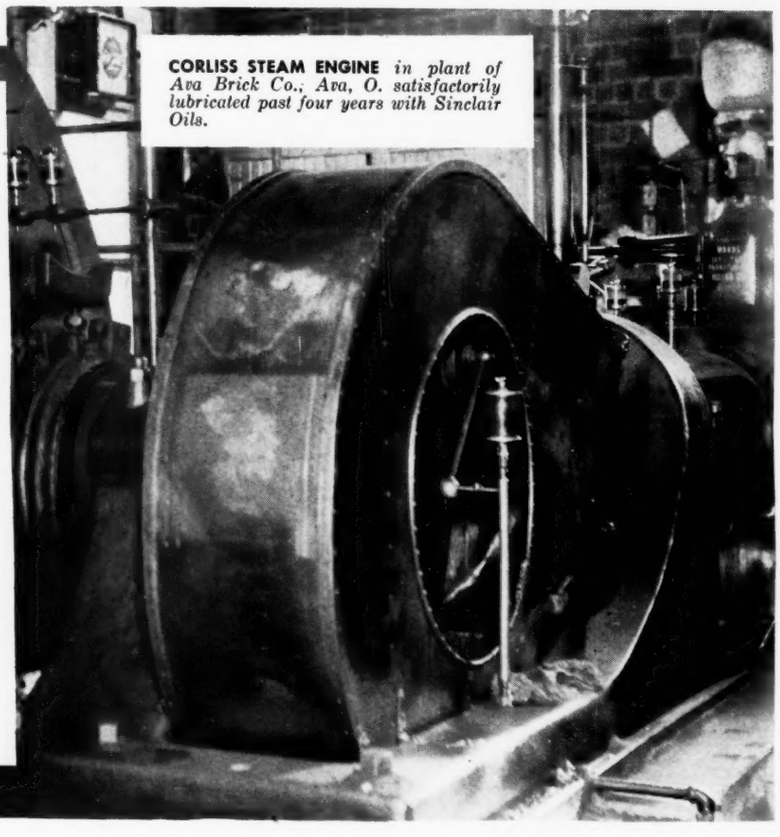
It is this "attention to detail" accorded to each design that is your assurance of the extra performance that means dependable, long time service.

**HALSTED STREET AT 48TH • CHICAGO, ILLINOIS**

**DEFENSE DRIVE** bans unnecessary lay-offs. Proper lubrication prevents forced shut-downs. For *STEAM ENGINES* there are . . .

**. . . SINCLAIR STEAM CYLINDER OILS** suited to any combination of operating conditions. You'll find a Sinclair oil that *correctly* meets your engine's speed, pressure, temperature, moisture condition, and steam recovery requirements. Write for details, or lubrication counsel, to nearest Sinclair office or to Sinclair Refining Company, 630 Fifth Ave., New York, N. Y.

*Write for "The Service Factor"—a free publication devoted to the solution of lubricating problems.*



**CORLISS STEAM ENGINE** *in plant of Ava Brick Co., Ava, O. satisfactorily lubricated past four years with Sinclair Oils.*

# SINCLAIR INDUSTRIAL OILS

SINCLAIR REFINING COMPANY (Inc.)

2540 West Cermak Road, Chicago • 10 West 51st Street, New York City • Rialto Bldg., Kansas City • 573 West Peachtree Street, Atlanta • Fair Building, Ft. Worth

# STEEL

## FOR HIGH STRENGTH
## FOR LIGHT WEIGHT

Your shuttle cars withstand hard usage because they are of high-strength steel construction. Why not give them storage batteries of the same construction?

In Edison Storage Batteries, steel cell construction brings you both high strength and light weight. High strength to withstand abuse and prevent time loss. Light weight to reduce power demands and save wear and tear.

Edison Batteries give you the further advantage of not requiring critical adjustment of the charging rate. In fact, they can be charged through suitable resistors direct from the d-c power supply.

Yet you get all these advantages at no extra cost. On the contrary, Edison Steel Alkaline Batteries are so long lived (two to five times longer than others) that their cost of operation per year is less. They are free from usual battery troubles, hence are less expensive to maintain. Edison Storage Battery Division of Thomas A. Edison, Inc., West Orange, New Jersey, U. S. A.

**Edison**

SO "AUTOMATIC" SAVINGS
AVERAGE
26¢
A TON
GET REPORTS OF USERS

# The Graveyard Business —pays BIG dividends

MANY profitable mine car graveyards have been made this year. Why? Because it pays big dividends to discard old-fashioned mine cars and install the wonder cars—the modern S-D 1-2-3 "Automatics." Records show that they save an average of at least 26 cents per ton and you can rent them from us at an average cost, over a fifteen year period, of less than 2 cents per ton of coal hauled in them. Of course, in buying them outright, you can make even more money than this, perhaps, because we make a profit out of it on the rental basis. You can produce far more coal per man with S-D "Automatics" and you can produce it at the least possible cost. Write us and we will prove this to you beyond question.

## FACTS BEHIND OUR CLAIMS

Records taken from the books of several coal mines prove an average saving of at least 26 cents per ton. Just the other day, a big operator wrote us as follows: "Our savings with S-D 'Automatics' will pay for the cars in less than 20 months." We are getting letters like this all the time. There is no question about the savings. Another operator writes: "In equipping a new mine, our first and only thought regarding cars is S-D 'Automatics'." Still another writes: "Your new type S-D 'Automatic' car with 'Floater' wheels is without doubt the best car we have ever used. At one mine we have just recently been able to produce 47,000 tons in one month with only 100 of these cars." These are facts, all of them. Would you like to have photostatic copies of the complete letters and others besides? Write for them.

DON'T WAIT to put in new S-D "Automatics" sometime next year. Get busy now and, if you haven't enough cash on hand at the moment, let us rent them to you.

We prefer to equip our mine cars with S-D "Floater" Ball Bearing Wheels. We guarantee that they will run the first ten years with only one greasing. Scientific engineering tests prove that these remarkable wheels speed up haulage approximately 10 per cent and increase haulage motor capacity approximately 49 per cent and save about $5.00 per car in electricity per year, based on cost of 1½ cents per KWH, compared with tapered roller bearings.

*We would just love to do business with you.*

**SANFORD-DAY IRON WORKS, KNOXVILLE, TENN.**

***Mine Cars, all types • Trailers • Wheels • Sheaves***

# THE *Swing* IS TO

## THESE 142 OPERATORS

### *Are Now Using*

### THE NON-EXPLOSIVE MINING METHOD

#### WEST VIRGINIA

Algoma Coal and Coke Company
American Coal Company.....(3)*
Ames Mining Company
Bellwood Coal Company
Brule Smokeless Coal Company.....(2)
Canyon Coal and Coke Company
Clear Creek Coal Company
Crab Orchard Improvement Company.....(2)
Crystal Block Coal & Coke Company
Crystal Block Mining Company
DePue Coal Company
Detroit Mining Company
Elk River Coal and Lumber Company
Imperial Smokeless Coal Company.....(2)
Island Creek Coal Company.....(2)
Jacobs Fork Pocahontas Coal Company
Jamison Coal and Coke Company.....(2)
Katherine Coal Mining Company
Koppers Coal Company
Lillybrook Coal Company
Minds Coal Mining Corporation
Monongahela Rail and River Coal Corporation
Pemberton Coal and Coke Company
Princess Dorothy Coal Company.....(2)
Pursglove Coal Mining Company
Raine Lumber and Coal Company.....(2)
Raleigh-Wyoming Mining Company
Raymond City Coal and Transportation Company.....(3)
Red Jacket Coal Corporation
Scotia Coal and Coke Company
Slab Fork Coal Company
South Side Company
Standard Fire Creek Coal Company
Sycamore Coal Company
Truax-Traer Coal Company
Turkey Gap Coal and Coke Company
United Pocahontas Coal Company
Upland Coal and Coke Company
West Virginia Coal and Coke Corporation .(3)
Weyanoke Coal and Coke Company.....(2)
Winding Gulf Collieries
Wood Coal Company

#### VIRGINIA

Benedict Coal Corporation
Gibson Fuel Company
Jewell Ridge Coal Corporation
Oakwood Smokeless Coal Corporation
Page Pocahontas Coal Corporation.....(2)
Red Jacket Coal Corporation
Sycamore Coal Corporation

#### KENTUCKY

Bell Coal Company
Big Jim Coal Company
Creech Coal Company
W. G. Duncan Coal Company
Elkhorn Coal Company
Goose Creek Mining Company
Grapevine Coal Company
Hart Coal Company
Harvey Coal Corporation
Knott Coal Corporation
Morris Brothers Coal Company
Norton Coal Corporation
Rogers Brothers Coal Company
Shearn Coal Company
Stearns Coal and Lumber Company

#### ARKANSAS

Great Western Coal Company

*INDICATES NUMBER OF MINES USING CARDOX METHOD

## CARDOX CORPORATION

# CARDOX

### PENNSYLVANIA

Butler Consolidated Coal Company
Christopher Mining Company
Clinton Block Coal Company
Hillman Coal and Coke Company
Moffit Coal Company
Pittsburgh Coal Company.....(9)
Edward Tomajko
Union Collieries.....(2)

### OHIO

Hanna Coal Company of Ohio.....(3)
Lorain Coal and Dock Company
Mine No. 6 Inc.
United States Coal Company.....(2)
Warner Collieries Company.....(2)

### ILLINOIS

Bell and Zoller Coal and Mining Co.....(2)
Blue Bird Coal Company
Consolidated Coal Company
Franklin County Coal Corporation.....(2)
Moore and Sons Coal Company
New Spillertown Coal Company
New Superior Coal Company.....(4)
Old Ben Coal Corporation.....(2)
Peabody Coal Company.....(3)
Sahara Coal Company
Thermal Coal Company
Truax-Traer Coal Company
Wasson Coal Company

### INDIANA

Glendora Coal Company
Ingle Coal Company
Knox Consolidated Coal Corporation.....(2)
Linton-Summit Coal Company
Standard Coal Company

### IOWA

Jensen Coal Company
Scandia Coal Company
Shuler Ccal Company

### OKLAHOMA

Atlas Coal Corporation
Premium Smokeless Coal Company
Starr Coal Company

### COLORADO

Alpine Fuel Company
Black Diamond Fuel Company.....(2)
Boulder Valley Coal Company
Canon Black Diamond Coal Company.....(2)
Canon Monarch Coal Company
Canon National Coal Company.....(3)
Clayton Coal Company.....(3)
Colorado Fuel & Iron Corporation
Consolidated Coal & Coke Company
Crested Butte Coal Company
Domestic Coal Company
Double Dick Coal Company
Griffith Coal Mining Company
Imperial Coal Company
Liley & Merlino
Louisville Lafayette Coal Co.
McNeil Coal Corporation.....(2)
National Fuel Company
Nu-Shaft Canon Coal Company
Oliver Coal Company.....(2)
Rocky Mountain Fuel Company.....(2)
William E. Russell Coal Company
Shamrock Coal Company.....(2)
Victor-American Fuel Company

### WYOMING

Burnell Coal Mines
Colony Coal Company
Kemmerer Coal Company
Osbourne Coal Company
Rock Springs Fuel Company
Sheridan-Wyoming Coal Company.....(2)

### UTAH

S. C. Harvey
Spring Canyon Coal Company.
Standard Coal Inc.
Uta-Carbon Coal Company

### MONTANA

Brophy Coal Company

### CANADA

Atlas Coal Company, Limited
Lethbridge Collieries, Limited
Red Deer Valley Coal Company, Limited
West Canadian Collieries, Limited
Western Gem & Jewel Collieries, Limited

*You, Too,* CAN BENEFIT THROUGH THE USE OF THE CARDOX METHOD . . . WHY NOT FIND OUT NOW . . . A SURVEY AND TEST SHOTS CAN BE ARRANGED AT YOUR MINE WITHOUT COST OR OBLIGATION . . .

*Write, Wire or Phone Today*

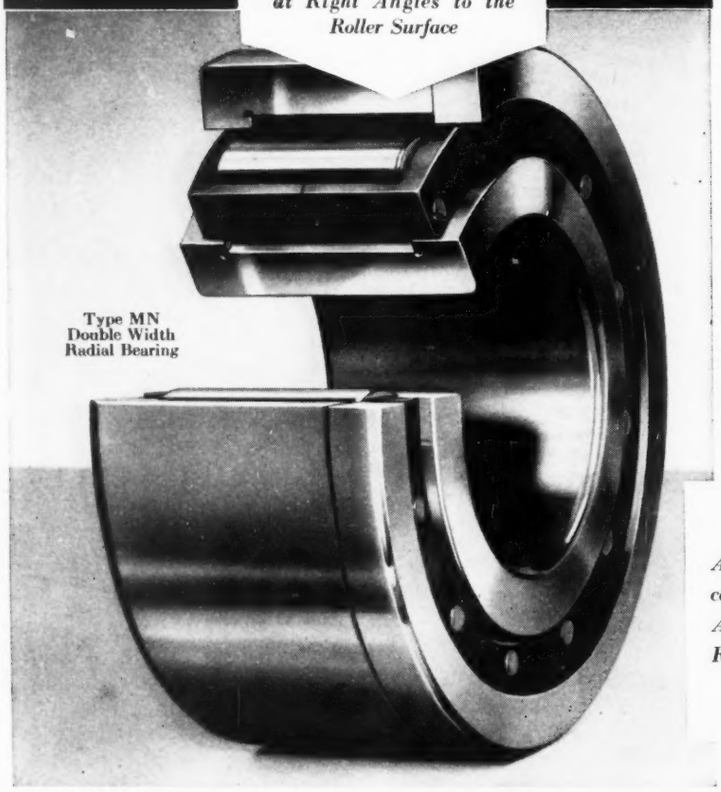
BELL BUILDING • CHICAGO

ROLLWAY'S

# Right-Angled LOADING

assures compactness of design . . . longer bearing life . . . and higher speeds under heavy loads

*All Radial Loads Carried at Right Angles to the Roller Surface*



Type MN Double Width Radial Bearing

## THEY'VE GOT WHAT IT TAKES FOR THE 168-HOUR WEEK

By splitting the load into its simplest components of pure radial and pure thrust, Rollway provides greater carrying capacity in a given space. Compactness of machine design is made possible. Wear is decreased. The friction load on each individual roller is lightened. And need for service attention is substantially reduced.

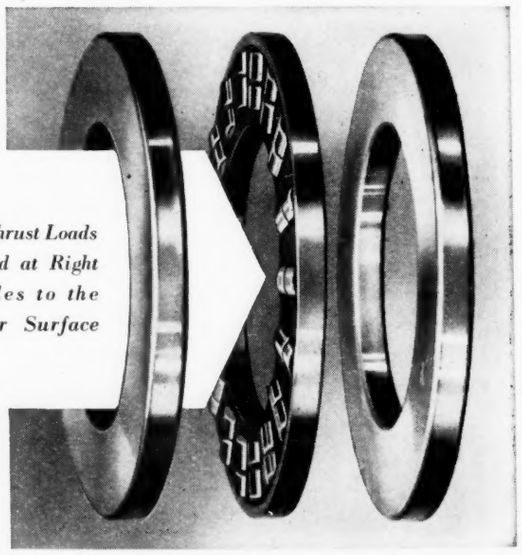
The sum of these advantages is reflected in longer bearing life, especially under conditions of high shaft speeds and heavy load . . . factors that are vitally important in today's 168-hour week and defense schedule speed-up.

For designs requiring simplified assembly to permit greater bearing area and capacity, Rollway double-width radial bearings with separable outer race not only simplify the mounting problem but greatly reduce wear even under extreme operating conditions. And they're specially constructed to absorb a relatively heavy locational thrust.

**Send us your plans today for engineering analysis and bearing recommendations.**

**REMEMBER**—*You can usually change over from other kinds of bearings to Rollways of higher load capacities without increasing boundary dimensions.*

Type T Single Acting Thrust Bearing

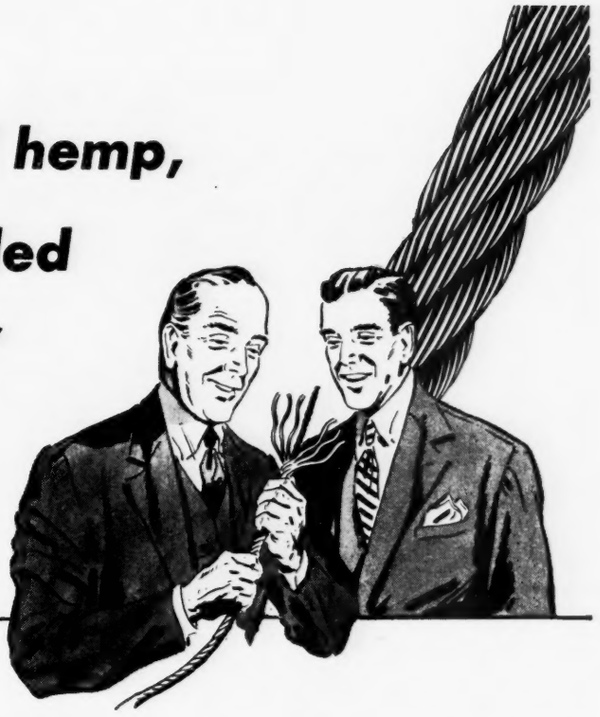


*All Thrust Loads carried at Right Angles to the Roller Surface*

ROLLWAY BEARING COMPANY, INC., SYRACUSE, N. Y.

BUILDING HEAVY-DUTY BEARINGS SINCE 1908 BEARINGS

# "You put in steel, and hemp, and something called Experience . . ."



### It's something only time and tasks can bring

"Make all the tests you want of wire rope samples. Pull them apart, into steel and hemp, and still you'll never find the quality that's paramount. The makers' experience . . . *knowing how.*

Our experience here at Roebling has two dimensions. You can count it on the map or on the calendar. You can see it working from the ingot to the finished reel.

When Doctor Beebe's Bathysphere sank down into the ocean's depths, a full half mile, his lifeline back to sunlight was a single length of Roebling "Blue Center" Wire Rope. When the builders of Mud Mountain Dam, Enumclaw, Washington, built a 35,000 pound tent that would cover half a city block, to protect their fill, Roebling Wire Rope was chosen to support its immensity, to hold against wind and rain.

Equipping the world's largest power shovel . . . building the Golden Gate and George Washington bridges . . . lifting lives from the world's deepest mine . . . Roebling is both the teacher and the pupil, whenever we tackle such a job. All across the country, on its lakes and oceans, Roebling's learning every day ways to make "Blue Center" better than before. Experience . . .

As Roebling field men learn from rope at work, new generations here at Trenton are learning secrets from the old. Father is teaching son how to tell when an ingot is ready to leave the soaking pit, to be kneaded into Roebling billets. Roebling engineers are learning more and more of wire rope's jobs, and how to meet them to a 'T'.

Roebling research is uncovering brand new facts that will make this trade mark mean even more to-morrow . . ."

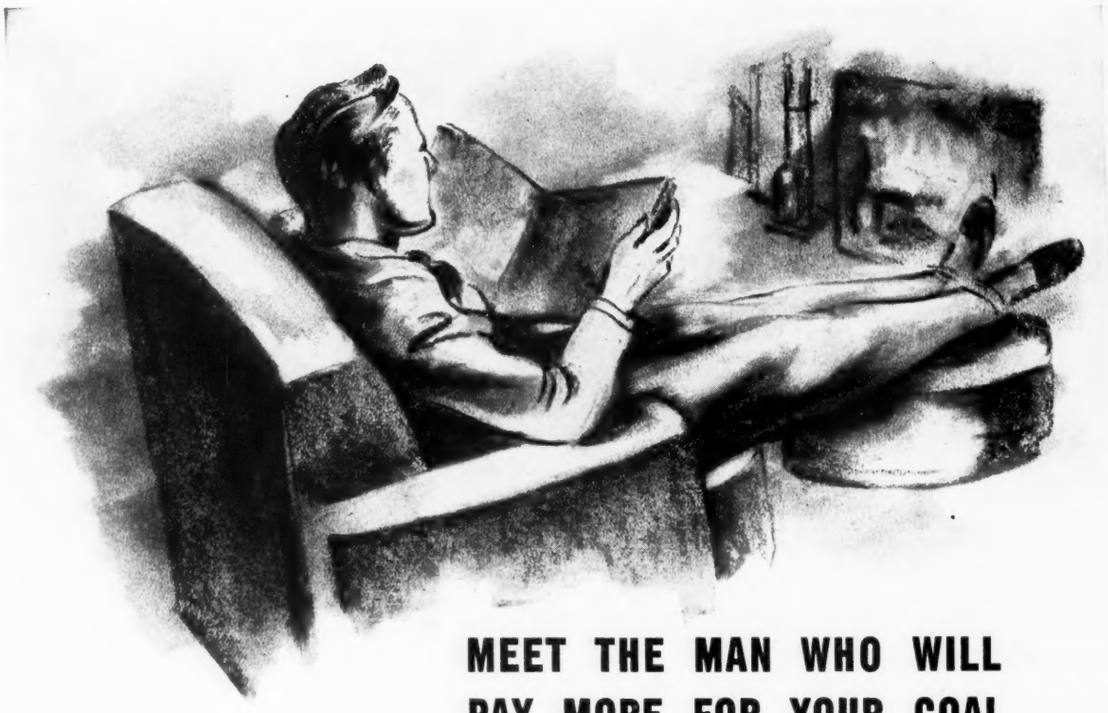
JR ROEBLING

Experience of men in the Roebling mills, of Roebling men in the field . . . Roebling process control, and engineering, and research . . . there's many a hidden ingredient in "Blue Center" Wire Rope. Reasons why it lives so long, and never fails to deliver its full measure of service.

JOHN A. ROEBLING'S SONS COMPANY
TRENTON, NEW JERSEY
*Branches in Principal Cities*

THAT'S THE ONLY WAY TO MAKE

# ROEBLING
## *"Blue Center"*
## STEEL WIRE ROPE
PREFORMED OR NON-PREFORMED



## MEET THE MAN WHO WILL PAY MORE FOR YOUR COAL

Are you prepared? The good buyers with the big money in today's market want uniformly prepared coal, clean and sized. If your mine lacks proper coal preparation equipment, you must take the small money at the bottom of the market.

Have you checked up recently on the cost to equip your mine now so that you too may have a chance at the top of the market? If not, you have a surprise coming. It will cost less than you think. It will actually pay for itself by increased realization. It will be the soundest investment that you ever made.

Why not get the figures for your mine? Look at the facts. Why not wire us today and let us present a proposal showing how you too may be prepared with the right equipment for your mine? There is no obligation. Roberts and Schaefer Company has done the job for profit making mines, large and small. Let us give you an estimate on your own problem. Wire us now.

# ROBERTS and SCHAEFER COMPANY

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WASHINGTON, D. C.

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# New Horizons are coming into focus fast!

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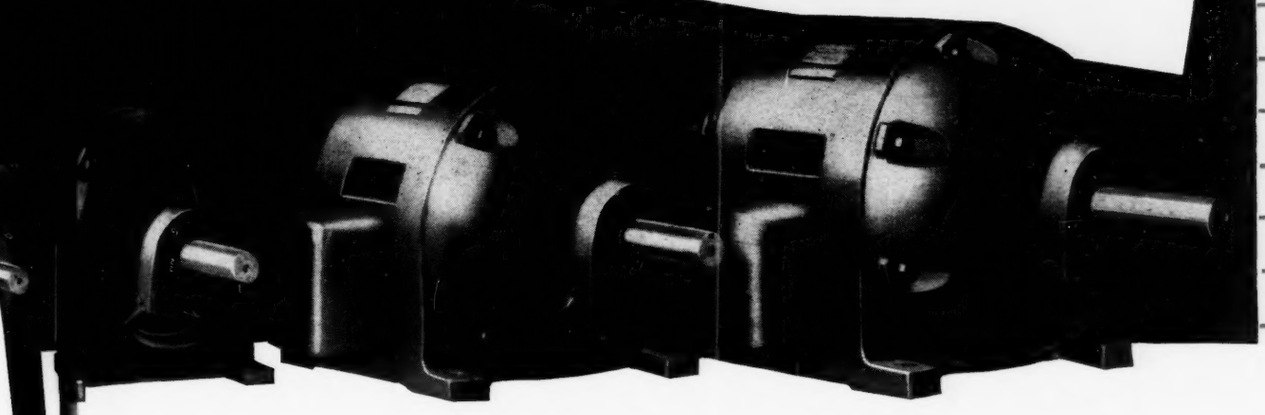

— 75 hp
— 60 hp
— 50 hp
— 40 hp
— 30 hp
— 25 hp
— 20 hp
— 15 hp
— 10 hp
— 7½ hp
— 5 hp
— 3 hp
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— 1½ hp
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**2**

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**4**

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| Chicago, Ill. . . . . 20 No. Wacker Drive | San Francisco, Calif. . . . . 1662 Russ Bldg. |
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*Offices in Principal Cities*

**HAZARD** WIRES AND CABLES FOR EVERY MINING USE

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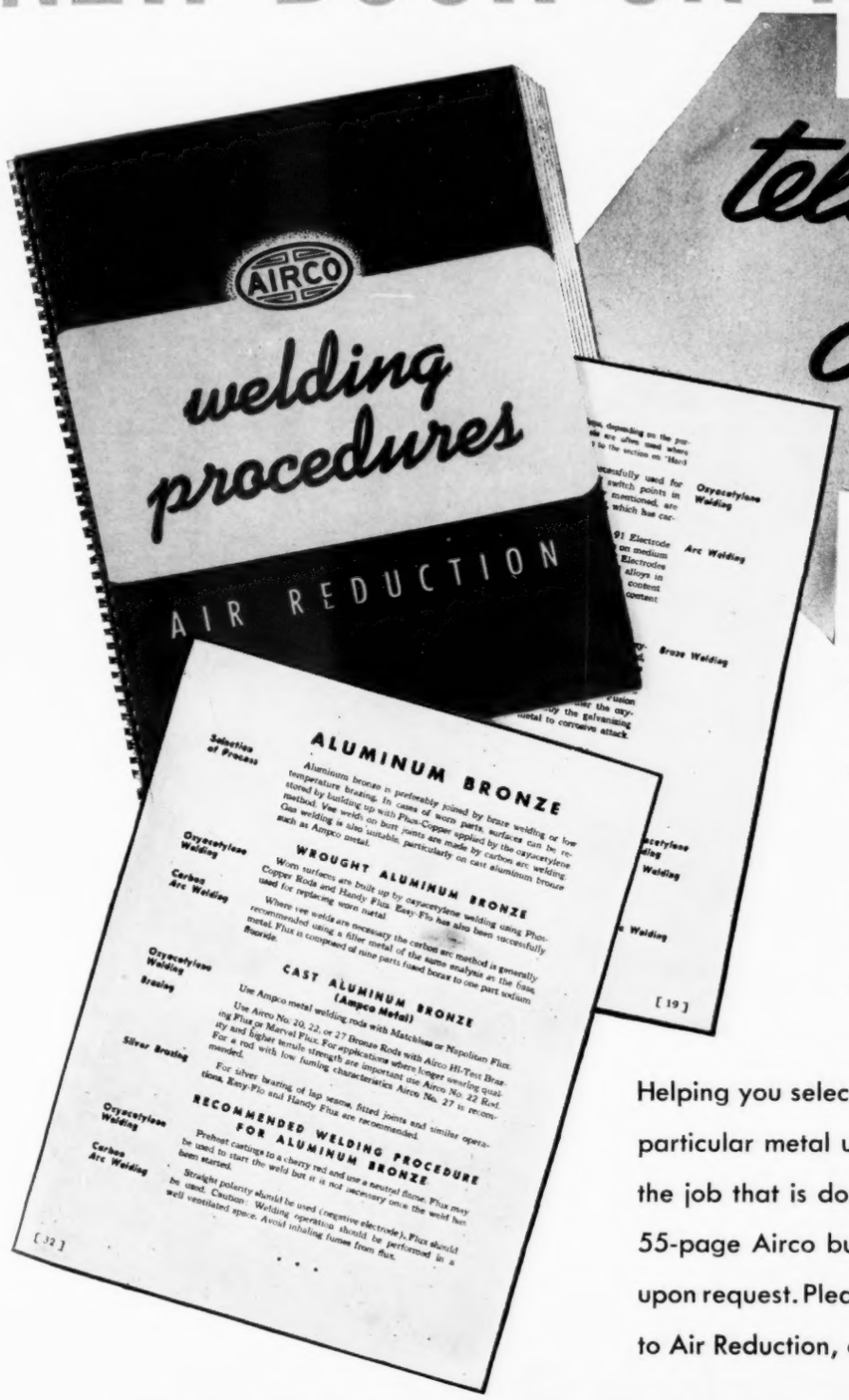


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for thin seam operation—
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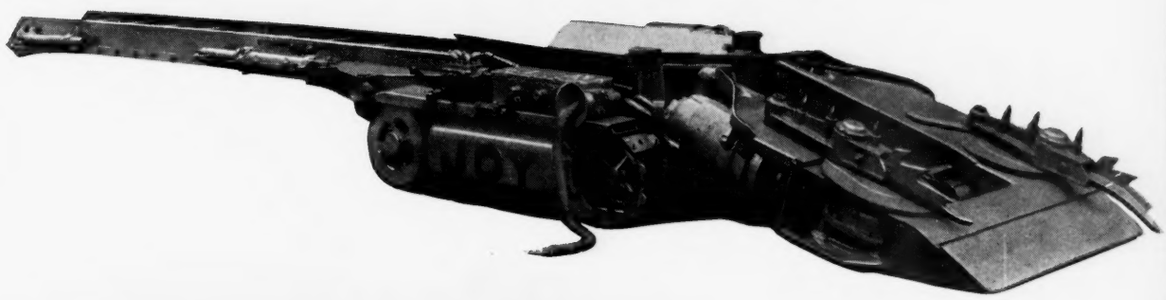
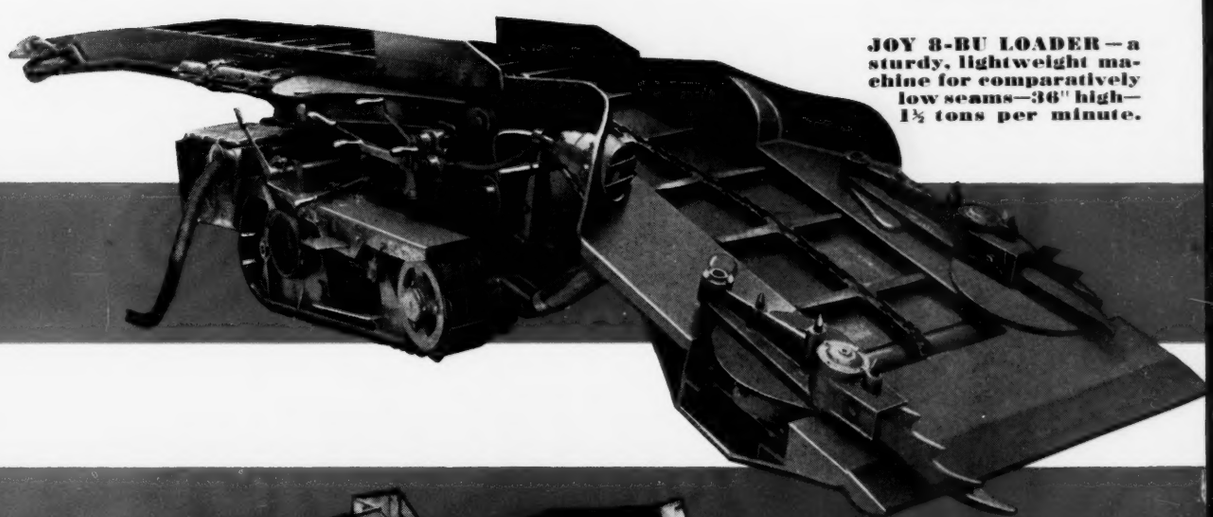
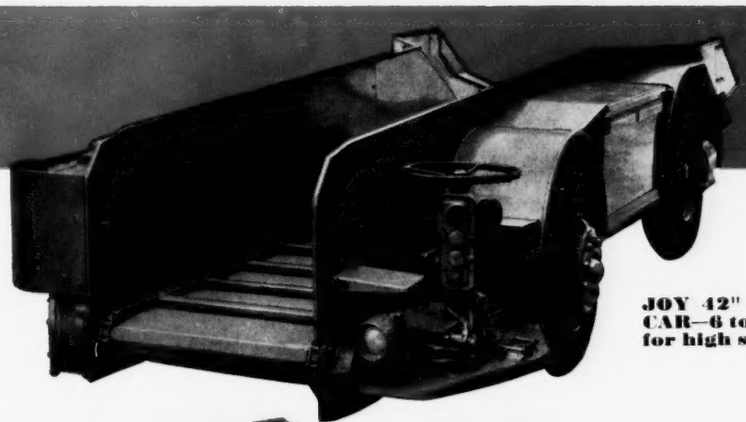
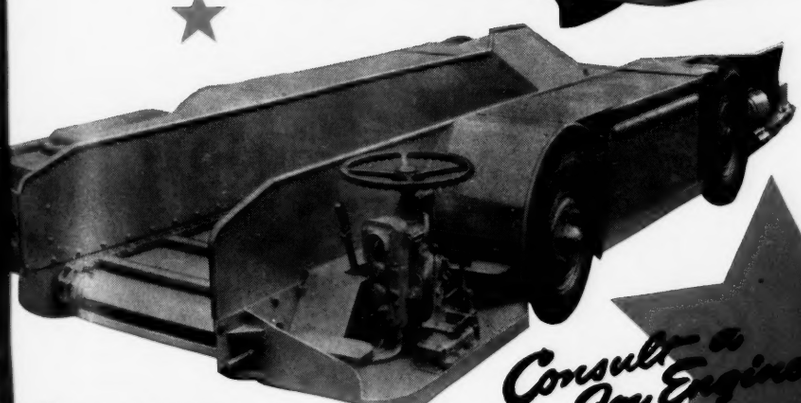




JOY 8-BU LOADER—a sturdy, lightweight machine for comparatively low seams—36" high—
1½ tons per minute.



JOY 42" SHUTTLE CAR—6 ton capacity for high seams.



JOY 32" SHUTTLE CAR—3½ ton capacity for low seam operations.

# JOY MANUFACTURING CO.,
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# Safety First

Keep pounding away at Safety First! It's your best bet! Carelessness is so easy, especially in routine jobs!

To help you we have issued a set of

**FREE BULLETINS**

These show the proper method of preparing the primer cartridge with Safety Fuse. The story is told in pictures that anyone can understand. Will you use a set? Write for it.

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SF-120

## ENSIGN-BICKFORD SAFETY FUSE

# What Can I Do?

EVER SINCE that Sunday morning when havoc swooped from the skies upon Honolulu, a new question has been churning about in millions of American minds. It is this: What can I do to help my country win this war?

This insistent question has pushed aside all matters of personal interest. From now on, individual wants and wishes must give way to the paramount needs of the nation. We all accept that. We have undertaken a huge job. Or, I should say, we have had a huge job thrust upon us. And unless we see that job through successfully it won't much matter what any of us may want.

That job is to win this war.

No longer are we trying to prepare for a war that we may get into. Today we are trying to win a war we're already in—and in up to our eyes. Nothing that any one of us now can do to help himself can get him very much if it does not also help our country to win this war.

I am sure that those who read these words will find many things to do. Some will enlist in the armed services. Some will become active in civilian defense. Some will labor to relieve distress in their home towns. Some will work with organizations set up to serve the men at the front. Each can and will find something he can do.

But this insistent question "What can I do?" goes beyond the individual and his personal service. It re-echoes through the offices and the shops of every American business concern. And what I have to say here is not directed toward individual effort. Rather is it intended for the men and women of American industry who make that industry a living part of American life. Today they are asking themselves: What can industry do? Or better still, what *must* industry do if our country is to finish the job it has started?

Those of us who work in and with American industry have one supreme obligation. We may feel very patriotic; we may be willing to serve "in any capacity;" we may be willing to sacrifice . . . if necessary. But if we fail to meet that one obligation, we shall fail our country in its time of need.

*THAT SUPREME OBLIGATION IS AN HONEST DAY'S WORK, EVERY DAY, FROM EVERY MAN, EVERY WOMAN, EVERY MACHINE. . . .*

*IT IS AS SIMPLE AS THAT!*

And that goes for all of us, whether we are engaged in civilian production or working directly on the weapons of war. American victory can be won only through the productivity of American industry.

Efficiency in production is not the responsibility of a few. It can be achieved only as we all put to useful purpose every minute of our time, every ounce of our energy, and every pound of our materials.

This responsibility of industry is the more vital because of what has happened to the business of making war. There was a time when success in war was chiefly a matter of well-trained, well-disciplined armies and competent leaders—when men were everything. In those days, military strength was a matter of strong battalions and able generals. Both still are vital. But today military might is essentially mechanical might. Modern war is an industry just as much as a factory or a railroad. In the first World War, mechanical equipment was relatively simple and limited. But today the special equipment of war and the expert skill needed to use it spell the difference between victory and defeat.

We Americans are not expert war-makers. That is why we must expect to suffer grievous losses before we can win substantial gains. We do not have military training and experience ready to hand when we need them. Neither do we have, ready for action, enough of the machines that are so essential to modern warfare.

So, when it becomes necessary to fight for our lives, we must start from scratch. And today, after a year's effort, we still are not ready to trade blow for blow with enemies who for years have schooled their leaders, trained and disciplined their people, and organized their industries to make war. We shall need more time to develop our strength. And while we are doing that, we must expect reverses.

But there is a brighter side to all this. For it follows that if we are granted this all-important time, the change in the method of warfare is right down our alley. The greater importance of mechanized equipment plays straight into the hand of the world's greatest industrial nation . . . if there is one thing America does know, it is industrial production! Our industries know how to produce. They have the skilled manpower. They have the organized facilities. Beyond any doubt, we can produce all that we need to win the victory that we *must* win—if only we are given the time.

*THE FIRST RESPONSIBILITY OF THE ARMED FORCES IS TO GAIN THAT TIME FOR US.*

*THE FIRST RESPONSIBILITY OF INDUSTRY IS TO USE TO THE FULL EVERY SECOND OF THAT TIME IN PRODUCING THE WEAPONS*

*THE ARMED FORCES NEED TO WIN THE ULTIMATE VICTORY. INDUSTRIAL PRODUCTION IS THE KEY TO VICTORY. BUT IT MUST BE BIGGER PRODUCTION AND FASTER PRODUCTION THAN WE EVER HAVE KNOWN.*

Heretofore American industry has worked to produce more of those things which make our lives more enjoyable. Today it must divert much of its energy from the products of peace to the weapons of war.

This change sets up a new yardstick of industrial performance. In time of peace we measure production efficiency in terms of money saved. From now on, we must measure efficiency chiefly in terms of time saved. For the plane, the tank, the gun, or the ship that is ready when it is needed to win a victory, is worth a million times more than the one that is delivered too late to avert a defeat.

Everyone knows how short we are of some materials and machines. But our most tragic shortage is the shortage of time. So whatever we may waste in the days ahead—and unhappily we are bound to waste plenty—let us never forget that the most deadly waste of all is the waste of time.

Time wasted never can be replaced. No one ever has discovered a substitute for time. If we would avoid the waste of this irreplaceable ingredient of victory, we must use every minute of it effectively—*while we still have it.*

That goes for us all. It goes for the man or the woman at the bench, at the desk, at the counter, in the field, or in the executive office. It goes for the politician as well as for the business man. It goes for the humblest and the most powerful. A nation at war cannot carry deadheads. It cannot spare a square foot for any one who will not pull his weight.

In this war, nothing short of complete victory can save the liberties of us all, rich and poor, employer and employee, haves and have-nots alike. The price of that victory is the labor, the loyalty, and the devotion of every last one of us. Winston Churchill said it well for the British people. You know how he said it. I need not repeat it.

All this imposes upon American industry, its owners, its managers, and its workers, the gravest responsibility they ever have assumed. If our country is to survive as a free nation, American industry must rise to that responsibility. If our country should fall, it would fall because American industry fell short of the need. It would be another case of "too little and too late".

This grave responsibility calls for the keenest management industry ever has known. It calls for unremitting research to make the most of our resources. It calls for the reduction of waste to a record minimum: that goes for waste of time, labor, and material. It calls for keeping our machinery working as near to full capacity as we can contrive. It calls for the highest rates of unit production we ever have known. That will mean skillful coordination by management and the most intelligent cooperation that the men in the shops can give. It calls for inventive ingenuity to match that of a nation which has produced some of the world's outstanding technical genius. For this is a war of technical proficiency.

But above all, it calls for a new devotion to the day's work. For so long as we are at war, the day's work will determine our country's security.

Whatever may be our material resources and our technical skill, however resourceful our management, however broad the scale of our effort, industry cannot measure up to its prodigious responsibility if any of us shirk the day's work. Right there is where we find the one thing we *all* can do—the one thing that is within the power of each of us.

*THAT ONE THING IS SIMPLY TO DELIVER AN HONEST DAY'S WORK WHEREVER WE ARE CALLED TO SERVE. HONEST WORK WILL WIN THIS WAR. LOAFING WILL LOSE IT. THE SHOWDOWN WILL BE WHETHER HITLER CAN DRIVE HIS PEOPLE TO WORK HARDER THAN WE ARE WILLING TO WORK. THERE IS NO ONE TO DRIVE US. WE MUST DRIVE OURSELVES!*

Is that so much to ask? It is all our country asks of us, the men of industry. It is all that the men who must work the guns and tanks in the field ask of us. It is all that the men who work our ships and our planes ask of us. "Give us the planes, the guns, the ships, the tanks, and all the rest of our tools," they tell us, "and we'll give you the victory that means so much to us all. But, in the name of that victory, give them to us quickly—QUICKLY—QUICKLY!"

Is that, I repeat, too much to ask of us?

* * * *

To help American industry achieve ever-higher standards of efficiency has been the traditional mission of McGraw-Hill for three-quarters of a century. Normally that effort has been directed toward higher efficiency in the business of peace. But, as in the first World War, twenty-five years ago, it now is directed toward efficiency in the business of war and in every department of American effort that can contribute, directly or indirectly, to the achievement of victory.

And to that mission, I here pledge every resource of this company, its publications, its books, its staff, and every service it is qualified by experience and training to render to American industry, now enlisted in our common cause.

That is what we of McGraw-Hill can do. And that is what we *shall* do to our utmost.

*President, McGraw-Hill Publishing Company, Inc.*

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*This message is appearing in all McGraw-Hill industrial and business publications, reaching over a million readers.*

DEVOTED TO THE OPERATING, TECHNICAL AND BUSINESS PROBLEMS OF THE COAL-MINING INDUSTRY

# Coal Age

Established 1911 — McGraw-Hill Publishing Co., Inc.
SYDNEY A. HALE, Editor • JANUARY, 1942

## Coal in the War Effort

WAR has been brought to us and it is now the job of the United States to carry it to a victorious conclusion at the earliest possible moment. The explosion of the first bomb at Pearl Harbor and subsequent declarations of war by other Axis powers automatically placed them in the class of actual rather than potential enemies. Thus, a clear objective is provided, simplifying things in this one respect but bringing up in turn the many other problems connected with conducting a war rather than getting ready.

COAL, like everything else, will have its share of new problems while many old ones will be intensified. Biggest, of course, will be getting out the tonnage—with equal or greater efficiency if possible, but tonnage regardless. Both the anthracite and bituminous divisions, available data indicate, have the capacity to handle the requirements of the immediate future *provided* demand is reasonably even, labor supply is not diminished, and the flow of the necessary materials, supplies and equipment is maintained.

SOME authorities forecast a 15-percent increase in industrial activity in 1942, exclusive of additions resulting from new construction. If this factor is applied to bituminous output for industrial purposes, the 1942 demand will be approximately 565,000,000 tons. With present producing capacity estimated at 12,000,000 tons a week, it theoretically is possible to fill the bill without difficulty, although, as stated, several things can interfere.

COAL, therefore has, among other things, the responsibilities of seeing that everything clicks to secure maximum output from present producing facilities, of developing new producing capacity as fast as necessary, and of working with the government in the development and application of regulations and policies designed to better fit the industry into war planning and activities.

RATIONING of coal, revisions in other distribution practices, allocation of transportation equipment and more rigid control over prices, to name some of the more important, are logically to be expected, and the industry should be prepared to lend all possible assistance in making such control measures as fair and equitable as possible. Further action in the control of equipment and supplies undoubtedly will be taken from time to time and here again coal should be ready to help make such action yield maximum benefits.

IN THE FIELD of production, coal must keep every item of equipment working at capacity, and must shape its work in power supply, maintenance and other auxiliary activities to that end. Idle working territories must be brought into production and more coal must come from active territories. Waste of materials must be prevented and reclamation and re-use stepped up. New materials must be substituted for those more vitally needed elsewhere. Preparation must be improved to turn out a product providing maximum efficiency in use. Last, but not least, greater safety is necessary to reduce the injuries, damage and loss of output resulting from accidents.

A BIG JOB is what it adds up to, but the industry can do it. Sharing in this confidence, *Coal Age* also accepts the responsibility of all-out service to the industry in carrying out its part of the war effort and planning for the post-war future. Accordingly, the objective for the duration is more on how to expand output, maintain efficiency, keep equipment going, secure and use equipment and materials to the best advantage, promote safety and cooperate with the government in the solution of economic problems. Winning is now the all-important consideration.

## Priorities

BOTH mine operators and manufacturers of supplies and equipment are relieved by OPM's clarification of order P-56, as recently revised by the Mine Priorities Section under the able administration of Wilbur A. Nelson and his assistant, D. L. McElroy. The new ruling recognizes all producing mine serial numbers, conferred by the State Emergency Coordinators, as authority for ordering supplies and equipment under an A-3 or an A-8 rating.

The new regulations materially simplify the problem of obtaining materials and machinery by making it possible for each operating company to place its orders with any supplier, rather than restricting them to those manufacturers listed under a priority number. To make sure that the industry is not handicapped any more than necessary, provision is made for an A-1-a emergency number in breakdown cases, which number may be obtained by phoning or wiring the Mine Priorities Section of OPM. With the new set-up, coal now is better able to meet its task of supplying the nation's war requirements.

## Keep 'em Rolling

EFFICIENCY and cost considerations always have supported the contention that coal-mining equipment should be kept running all the time or as near full time as possible. With more tonnage the goal, maintenance and proper handling of equipment moves even farther toward its rightful place in the coal-mining picture.

Few will question the conclusion that setting up maintenance solely to fix machines after breakdowns is the wrong way to go at the problem. Rather, major attention should be given to proper use of equipment and on inspection and preventive maintenance designed to reduce such breakdowns to a minimum. It is conceded that accidents and other unforeseen circumstances will put equipment out of service, but if proper attention is devoted to preventive measures and training of operators, handling such things automatically will take its rightful place, which is secondary to inspection, prevention and training, although still vital.

Materials and supplies to keep coal-mining equipment running undoubtedly will be provided, but they may be harder to come by and coal companies have an even greater responsibility for insuring economy in their use. Overhauling maintenance, with emphasis on preventive work, and better care of equipment will go far toward easing the materials problem in addition to insuring all the tonnage that will be needed.

## Challenge

"WHAT can I do?" well describes the state of mind in America today. It therefore is the theme of James H. McGraw Jr.'s message to the more than 1,000,000 McGraw-Hill readers appearing elsewhere in this issue, reprints of which, minus the last section, referring to McGraw-Hill service to the industry, are available to all who want them in limited numbers; in large quantities at cost.

Time to do the job, Mr. McGraw significantly points out, is the vital element. Supplying us with that time is the first responsibility of our armed forces. Using to the full every second of that time in producing the weapons needed to achieve victory is the responsibility of industry. That is the challenge.

To help American industry meet that challenge is the goal of the entire McGraw-Hill organization. In this pledge to the men and industries it serves, *Coal Age* joins with all the force at its command.

## Water Too Viscid

WATER FLOWS off a duck's back with such facility because of an oil —perhaps oleic acid—which has the property, as Professor A. F. Taggart, of Columbia School of Mines, recently showed, of breaking up with almost explosive violence a blob of mineral oil resting contentedly on the surface of water. A very small quantity of greatly diluted oleic acid will turn the trick.

So probably this same oleic acid, which thus reduces surface tension, can be made to help water to free itself from coal and will be the means of making it easy to drain fine coal now requiring evaporation before shipment, and perhaps it or something similar to it may enable cementing fluids to pentrate infinitesimal cracks in shafts and tunnels and so make cementation effective.

## Mined and Sealed

EFFICIENCY and economy in business call for completing and closing each job or transaction as soon as possible. And that goes for each working section of a mine. Immediately upon completion it should be closed once and for all with adequate seals. The numerous tangible advantages will in most cases offset the cost. Where sealing is the practice all usable materials necessarily are immediately recovered from the area; power and supervision costs of ventilation for that area cease; dangers from accumulations and outbursts of gas, from air blasts due to roof falls and from the propagation of an explosion from one active area to another via the worked-out area are eliminated.

## Saboteurs

EXPLOSIONS in explosive factories and in coal mines after a long period of freedom from such occurrences suggest sabotage. Action should be taken to forestall such fifth-column devastation by careful inspection. Operators are at a disadvantage because today a proved overt act is necessary to justify discharge. However, it is always best to make the mine almost explosion-proof—proof at least against a general catastrophe—by ample ventilation, breaking the coal down with minimum degradation, wetting the cutter-bar, the coal face and fallen coal, and extensive use of rock dust.

Like the man who was accused of beating his wife and claimed first that he did not beat her and that he had no wife, the operator should protect dust from exploding and then endeavor to make no dust that can be exploded by coarser cutting and drilling and less violent breaking or shooting of coal. Incidentally, has anyone ascertained the percentage of explodable dust made in cutting and drilling coal with different types of cutter-bars and drills?

# PREFORMED D.C. POWER

## Provides Proper Starting Conditions For Picking Up Heavy Cross-the-Line Loads

**By inserting resistance in the generator fields to lower the voltage for a few seconds after the breakers close, a heavy across-the-line d.c. pump and equipment load is picked up without danger of injury to motors or m.g. sets at Sterling No. 6 mine. This objective is attained by automatic reclosing breakers designed to operate at 300 or 150 volts plus a contactor and timing relay for cutting resistance into the generator field circuits and bridging it out automatically, thus supplying reduced voltage for accelerating the mine load.**

By JOHN M. RAIRIGH
*Chief Electrician*
*Sterling Coal Co.*

SOMETHING new in electricity for the coal-mining industry has been developed and applied at the No. 6 mine of the Sterling Coal Co., Bakerton, Pa. Mining men have long been in need of a direct-current power system capable of picking up and accelerating a momentary dead load of five to six times the capacity of the switching and generating equipment in their substation. This load usually is made up of manually operated mining machinery such as pumps, room hoists, coal cutters and locomotives, which are subject to the handling of those who use them, and invariably hang across the line after a circuit-breaker outage. Needing such a system in its mining operations, the Sterling Coal Co. therefore has developed a substation to perform this duty.

The system is based on the theory of a reduced-voltage start, whereby the generators are applied to the mine load at a voltage reduction of 50 percent for an accelerating period of 10 seconds, after which the full voltage is applied. The equipment used to attain this objective consists essentially of automatic reclosing circuit breakers designed to operate at any d.c. voltage from 150 to 300 and reclose against a heavy dead load at the lower figure. It was built by the I-T-E Circuit Breaker Co. Auxiliary control equipment was supplied by the Cutler-Hammer Manufacturing Co. This auxiliary equipment, which consists only of a mercury timing element and a two-pole magnetic contactor, by which a resistance is automatically cut in and bridged out of the field circuit, does the trick of applying the d.c. power to the mine at reduced voltage through the circuit breakers.

Operation under this system has proved that the severe shock on the generator windings, commutator and brushes, also the shock taken by the synchronous motors, has been entirely eliminated, allowing the generators to start to work as conventionally intended. The system also has been most satisfactory inside the mine, where any motor lying across the line has reduced voltage on which to accelerate, eliminating the shock of starting at full voltage, which is poor practice when maintenance costs are taken into consideration. Let it be pointed out before we go further, however, that a short circuit cannot be picked up or carried under this system, as this possibility has been thoroughly taken care of in the automatic switching relays of the I-T-E breaker panels.

Meeting the conditions growing out of the water-handling problem at Sterling No. 6 was the major factor in the study which resulted in the voltage-reducing system. Numerous small d.c. pumps are required, and equipping them with individual starters was considered impracticable from both the first-cost and maintenance standpoints, in addition to the fact that the simpler a unit installation could be made the more dependable would be the pumping service. Starting across the line at full voltage, of course, simplified the control system, but was hard on the motors. Inserting a fixed resistance to limit starting current, while it would help in picking up the load, would penalize the motors in normal operation in addition to wasting power. Consequently, the desired result at Sterling No. 6 (generator and pump-motor protection) was obtained by reducing the voltage at the substation. It logically follows, also, that the same system may be used not only for protection but also as a means of obtaining proper starting conditions without individual starting equipment for each pump or other operating unit.

Average output at Sterling No. 6, recovering the "B" seam some 44 in. thick, is 1,500 tons per day of one tipple shift. A companion operation, Sterling No. 1, produces around 1,600 tons per day. The supervisory force for both mines includes John F. Foreman, general superintendent, and C. J. Hannigan, superintendent.

Production equipment at No. 6 includes one 6-wheeled 18-ton Baldwin-Westinghouse locomotive, three motors, 225 hp. total; two 12-ton B-W locomotives, two 50-hp. motors each; six 10-ton B-W units, two 50-hp. motors each; two 29-C arcwall cutters, one 50- and one 20-hp. motors each; three 12-AB shortwalls, each with 35-hp. motor; and 50 5-hp. room hoists with manual starters. The mine is wet

and conditions require the use of a large number of pumps, as follows: 40-hp., 3; 25-hp., 1; 15-hp., 3; 5-hp., 8; 3-hp., 12 to 15. Most of the pumps are in isolated locations and are changed about frequently.

Direct current for underground equipment is supplied from a surface substation at an air and escape shaft about a mile back from the drift opening. Active workings at present are a mile farther in. The substation is equipped with two Ridgway synchronous motor-generator sets (2,300 volts a.c./275 volts d.c.) operating in parallel, with one 150-kw. machine in reserve.

Power is taken into the mine by three 500,000-cir.mil Simplex "Anhydrex" cables suspended in a borehole near the shaft by wood strain insulators. Branches from the bottom of the borehole consist of No. 9 deep-section trolley wire on the main line; 500,000 cir.-mils in parallel with No. 9 to one working section; and 1,000,000 cir. mils in parallel with No. 9 to the other working section. The return is essentially two 50-lb. rails bonded with Ohio Brass and Mosebach long bonds (steel-welded) to a cable in the air shaft back to the substation. In a few locations, the rails are paralleled by 4/0 round wire.

Production equipment operating on the first shift, during which the major part of the loading is done, includes all the room hoists and locomotives. About half the room hoists and part of the locomotives also are in service on the second shift, which also is the cutting shift. Pumping, however, is a 24-hour job. Consequently, the practice is to run both m.g. sets during the first and second shifts (6:30 to 11 p.m.) and then drop back to one from 11 p.m. to 6:30 a.m. the next day.

Although a limiter holds the overall 15-minute demand for No. 1 and No. 6 together to 675 kw., the breaker settings at No. 6 permit an instantaneous peak of 2,400 amp. with both sets operating or 1,200 amp. with one. Most of the breaker operations take place on the first and second shifts when the locomotives are in service. Very few occur on the third shift.

Before adoption of the voltage-reducing system, however, flash peaks of 3,000 amp. or more were encountered in trying to pick up the pump load in addition to what hoist and other load might be on the system waiting for a restoration of power. The heavy strain on the generating equipment and consequent possibility of damage and severe service interruption was the major factor in the decision to install the voltage-reducing equipment. Other troubles included loss of time through repeated circuit breaker outages before the system became sufficiently stabilized for picking up the load. Even then, the strain on the generators resulted in poor commutation and excessive arcing.

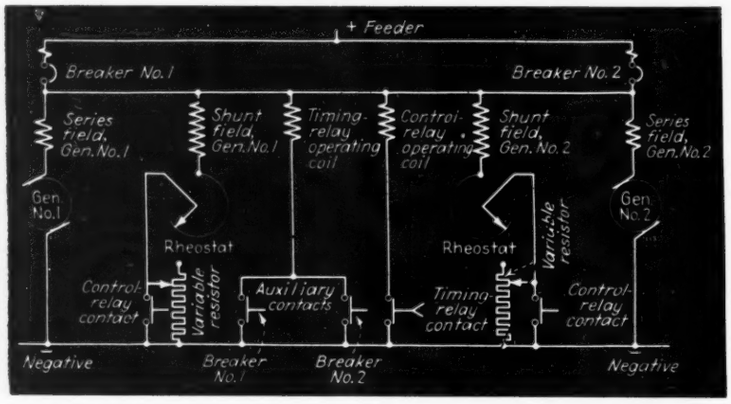
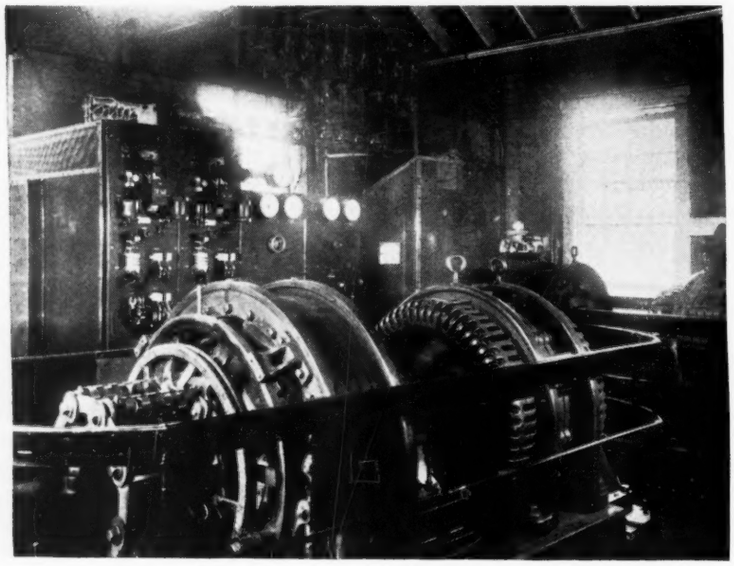



Fig. 1—Schematic diagram of the voltage-reducing system. Although rheostats are not employed and fixed auxiliary resistances are not used at Sterling No. 6, they are included to make the diagram more general. For general applications and where machines of unlike characteristics are employed, variable auxiliary resistances would be proper to use.



Showing the two 200-kw. m.g. sets supplying power to Sterling No. 6 mine, with the new breaker panels in the background.

## Pump Motors Protected

A second important factor was pump-motor protection, as full-load starting, drawing up to six times normal current, naturally had an adverse effect on armatures, brushes, brush rigging, etc. Although the three 40-hp. and one 25-hp. pumps were equipped with Ohio Brass KSD starters, the installation of similar starting equipment on 24 or so other pumps in service was felt to be impracticable, as stated, from both the first-cost and maintenance standpoints. Consequently, they are connected across the line through a fused switch which permits putting them on or cutting them off as necessary, and the voltage now is reduced at the substation to permit starting without the heavy flash peak encountered in starting at full voltage.

The voltage reduction is accomplished by means of two special I-T-E 1,000-amp. Type KSA automatic reclosing circuit breakers in conjunction with the Cutler-Hammer automatic d.c. field-control panel. Each

**John M. Rairigh**

*Mr. Rairigh has been active in the central Pennsylvania field for the last 25 years, beginning his career with the Lackawanna interests, at Wehrum, in Indiana County, and following this up with eight years with the Loyal Hanna interests at Cairnbrook, Somerset County, before joining the Sterling Coal Co. organization, Bakerton, Cambria County, 14 years ago. An I.C.S. graduate, Mr. Rairigh developed the theory of the reduced-voltage start for his company and later proved it in operation at the Sterling No. 6 mine.*

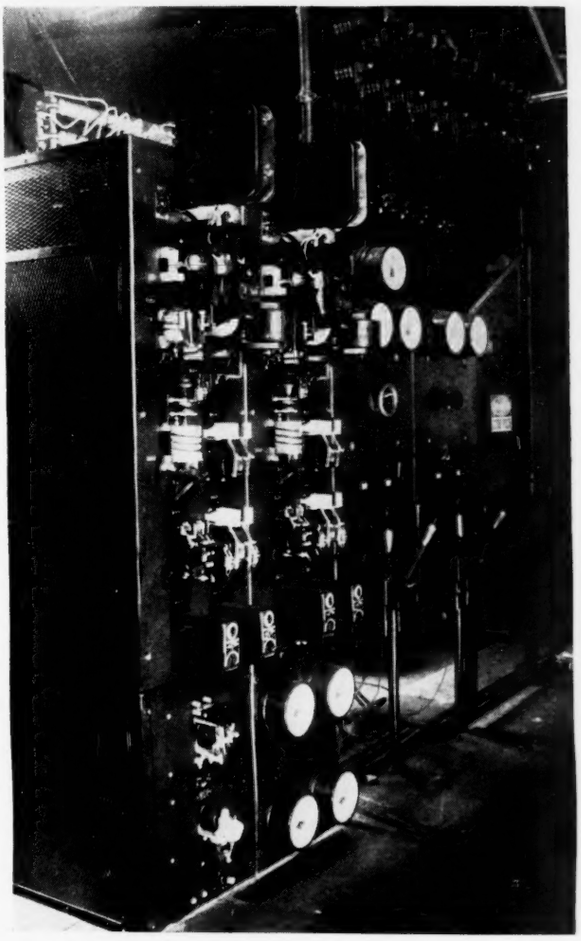
breaker is mounted on a separate panel, this arrangement permitting the generators to feed a common load in parallel and also making possible moving one generator and breaker panel to a new location in the future. The breakers are arranged for combination independent and tie-feed operation, and are accompanied by the necessary relay and control equipment, including time-delay, reverse-current, closing control, instantaneous overcurrent, time-delay overcurrent, load-measuring, resistor-control, voltage-differential and selective-control relays, as well as equalizing switches mechanically interlocked with the breakers. The field-control panel comprises a No. 224 double-pole contactor, mercury dashpot timing delay and two groups of resistances, one for each generator.

On overload or short circuit, the breakers open and in turn open auxiliary switches in parallel. Opening of the switches at the same time opens the No. 224 contactor, inserting the resistances into the generator field circuits and causing the voltage to drop to 150. After the set time interval (10 seconds, which can be changed to suit conditions) the breakers reclose on the lower voltage. The load-measuring equipment for the breakers was especially calibrated at the factory to allow for picking up unusually heavy dead loads at half voltage.

When the breakers reclose, the auxiliary switches also are reclosed to start the timing cycle with the mercury dashpot relay. This timing cycle requires 10 seconds, during which service to the mine goes on at 150 volts. This 10-second period provides ample time for the 1,150-r.p.m. pump motors to accelerate. At the end of the period, the dashpot relay closes the No. 224 contactor and short-circuits the extra field resistance, whereupon the generators quickly build up to 275 volts without complaint or disturbance of commutation. And since the desired condition, a voltage reduction for the necessary length of time, is provided by this scheme, the pump motors start normally and without strain.

Either or both the Sterling No. 6 sets can be connected to the bus at 150 volts, making it possible for either machine to be selected as the leading one in starting up the station. So long as one machine is on the line, use of the double-pole contactor for handling the resistance for both fields permits the other also to come on at full voltage.

A voltage-reduction system of this type also would be applicable where more than one substation was in service if interlocking of the circuit breakers could be arranged so as to bring the second station onto the line at full voltage after an interruption causing the breakers to go out in both stations. In the case of converters started by hand, a heavy bank of cast-grid resistances might be used in series with the mine load after a breaker outage, this resistance being shunted out after the breaker closed. Or, in the case of a converter with full-automatic controls, the machine could be transferred back to the starting contactors when the voltage was reduced for picking up the mine load.



**Close-up of new breaker and field-control panels. The latter is on the bottom at left. Note equalizing switches mechanically interlocked with the breakers at the tops of the panels.**

# MECHANICAL MINING

## In the Elkhorn District Uses a Variety of Conveyors and Loaders*

By L. E. KELLEY
*Division Engineer*
*Consolidation Coal Co., Jenkins, Ky.*

COMPLETE mechanization of a great many mines and partial mechanization of others in large numbers has featured developments in the Elkhorn district of eastern Kentucky in the last few years. The most important coal bed is commonly known as the Upper Elkhorn No. 3 seam, which has been mined continuously since about 1912 and up to just a few years ago entirely by hand loading. A large percentage of the district output still is loaded by hand.

The quality of the coal is excellent, but, as frequently happens, the seam in some localities presents difficulties in mechanical mining. These conditions have necessitated careful study of any given area before it is mechanized. Many installations still are in the experimental stage. The top varies from good to bad. Coal is left up for roof protection in some sections. In others, the entire seam is mined.

Bed thickness ranges from 36 or less up to 84 or more inches. Large areas are characterized by a middle parting ¼ in. to several feet in thickness. Certain areas are marked by two impurity bands and a top or bottom rash often is present. These factors cause many preparation difficulties. The problem of loading out the middle parting and disposing of it is serious. Performance is greatly affected when it is 6 in. or more thick. Close timbering, generally necessary in this seam, also materially affects performance. In most areas, the bottom is fairly soft and scaly.

*Mining With Hand-Loaded Conveyors*—Hand loading onto conveyors has been practiced at various mines for a good many years. Both drag, or chain-and-flight, and shaking equipment have been used. Some installations have been successful. Others have failed. A typical drag-conveyor installation is shown in Fig. 1. Rooms are driven one at a time 35 ft. wide and 25 ft. deep. Very good results were obtained until four or five rooms had been worked out, when it became impossible to hold the top, and the system was abandoned.

Shaking conveyors later were installed in another mine, using system illustrated in Fig. 3. This layout was entirely successful and at times production reached an average of 15 tons per men. Where roof conditions permit, faces sometimes are worked as wide as 100 ft. or more.

*Mining With Shaking Conveyors and Duckbills*—Shaking conveyors equipped with automatic duckbills have gone into service at a few mines in the district in the last few years. The general opinion is that this equipment is successful. Fig. 4 illustrates a mining method now employed. Some of the advantages are: Close timbering is possible; the duckbill has a good loading capacity; the equipment can be handled with a small crew (usually eight men for a pair of conveyors); the cycle of operation is simple; and, generally, two or more operations can be carried on simultaneously. The greatest disadvantages are lack of mobility and large capital investment for a small tonnage.

*Mobile Loading, Track-Mounted Equipment*—Track-mounted equipment is especially suited to entry driving. It trams rapidly and, when the bottom is soft, usually will be more satisfactory than crawler-mounted machines. Also, under bad, closely timbered roof the track-mounted machine is safer to operate. The operator is back from the face under crossbars and there is less likelihood of knocking out timbers. Fig. 2 illustrates a development layout for a track-mounted loader. The coal was 48 in. thick with a 1-in. middle parting. Working places were only 12 to 14 ft. wide and roof conditions were very bad. The crew was made up of 14 men, including the foreman, and they averaged about 147 tons per shift.

A standard, or ideal, schedule was prepared for this crew as follows:

Places 1, 2, 3 and 4 must be completely prepared and ready for the loading machine.

Places 5, 6 and 7 must be cut and Places 5 and 6 bugdusted.

Crew then will start the shift in the following manner:

Loader in Place No. 3.
Shooter in Place No. 5.
Drillers in Place No. 6.
Bugdusters in Place No. 7.
Cutters in Place No. 8.

Trackmen and timbermen start where work is required but immediately after loaders clean up No. 1 they will extend the track and then follow the loader the rest of the shift.

Cutters must completely bugdust every third place.

Bugdust to be thrown back for two cuts, when it must be loaded in mine cars by the loading machine.

Crew make-up was as follows: loading machine operator, helper, motorman, brakeman, driller, helper, trackman, timberman, cutting-machine operator, helper, No. 1 bugduster, No. 2 bugduster, shooter and

* Abstracted from a paper presented at the Kentucky Mining Institute, Dec. 6, 1941.

foreman or face boss. It was a great advantage to have a definite schedule of operation in this case.

Mining wide rooms is another adaptation of mobile loading in the district, as shown in Fig. 5. Coal thickness is 54 to 60 in., with 4 to 8 in. of middle parting. Handling these impurities greatly hinders operation, but a fairly good job is being done even under this handicap. A good percentage of the impurities are gobbed in the rooms. Life of rooms is very short and very little trouble is encountered with roof.

*Mobile Loading, Crawler-Mounted Equipment*—This type of equipment is rather widely used in development, wide rooms and pillar drawing. In one mine, the seam consists of 48 in. of coal, 30 to 48 in. of rock parting and 48 in. of bottom coal. This seam has been mined successfully with up to 42 in. of rock parting. The coal is cut just under the rock. The rock then is drilled and shot and then raked out by the cutting machine. After the rock is loaded with the crawler-mounted machine, the coal benches are drilled, shot and loaded. Averages of 75 to 90 tons per shift have been achieved. This coal cannot be mined successfully by hand methods. To provide space for the rake after raking, the cutter bar is 13 feet long, although depth of cut is only 6 ft.

Fig. 6 is a commonly used projection for face-entry driving with this type of equipment. Seven working places are maintained with a five-heading layout. In 48 in. of coal, with a 12- to 14-man crew where impurities have to be handled, about 125 to 150 tons can be produced per shift.

A standard projection for the Elkhorn seam is shown in Fig. 7. The main entries are developed in groups of seven places (five places for face entries). The panel then is developed into 180-ft. blocks, which usually are exhausted by five 25-ft.-wide rooms. The butt, or room, entries are driven in pairs so that the loading machine will have four to eight working places at all times.

This plan is suitable for either track- or crawler-mounted equipment or conveyors. It also can be used for rubber-tired or shuttle-car mining. Application to shuttle-car mining is shown in Fig. 8. A shuttle-car crew usually consists of 15 to 18 men and performances of 200 to 300 tons per shift in 48-in coal are not unusual. The extreme mobility of the equipment, as well as elimination of most of the usual trackwork, makes it very successful where conditions indicate its use.

An experimental shuttle-car installation was made in a mine using the so-called block system two or three years ago (Fig. 9). The schedule of

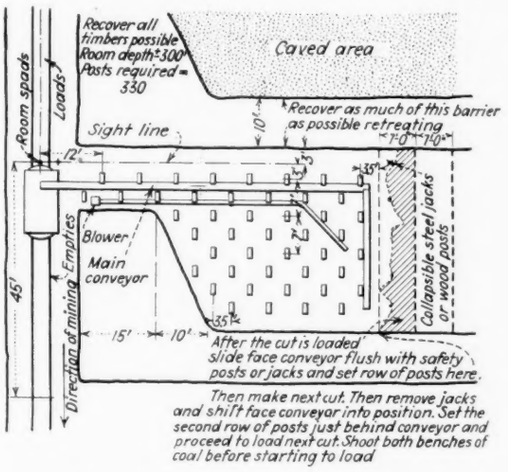

Recover all timbers possible
Room depth=300'
Posts required=330
Caved area
Room spads
Loads
Sight line
Recover as much of this barrier as possible retreating
Blower
Main conveyor
Empties
Collapsible steel jacks or wood posts
45'
15'
10'
35°
Direction of mining
After the cut is loaded slide face conveyor flush with safety posts or jacks and set row of posts here.
Then make next cut. Then remove jacks and shift face conveyor into position. Set the second row of posts just behind conveyor and proceed to load next cut. Shoot both benches of coal before starting to load

Fig. 1—Typical drag-conveyor installation.

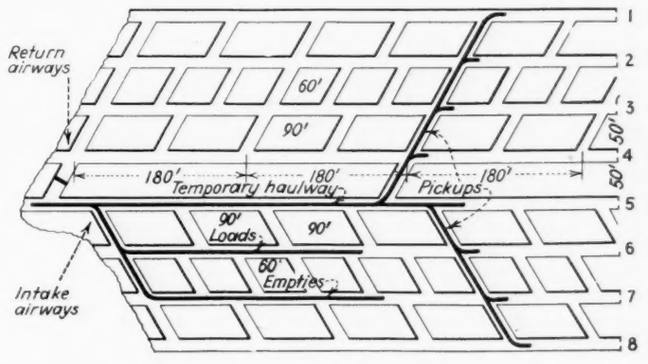



Fig. 2—Developing with track-mounted loader.

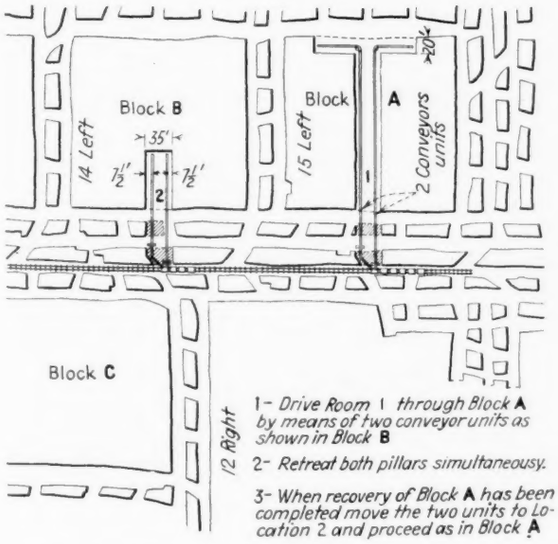

Block B
Block A
14 Left
15 Left
2 Conveyors units
20'
35'
7½'
7½'
Block C
12 Right
1- Drive Room 1 through Block A by means of two conveyor units as shown in Block B
2- Retreat both pillars simultaneousy.
3- When recovery of Block A has been completed move the two units to Location 2 and proceed as in Block A

Fig. 3—Mining with duckbill-equipped shaking conveyors.

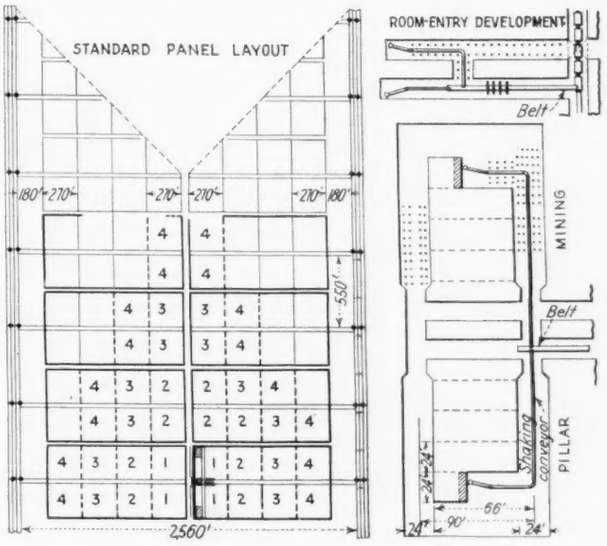



Fig. 4—Shaker-conveyor system.

proposed operation was set up thus:

To begin the first shift, places must be in the following condition:

Places 1, 2, 3 and 4 must be completely prepared ready for the loading machine.

Places 5, 6, 7 and 8 must be cut and 5, 6 and 7 bugdusted.

Crew to start shift in the following manner:

Loader start in Place No. 1.
Shotfirer in Place No. 5.
Drillers in Place No. 6.
Bugdusters in Place No. 8.
Cutters in Place No. 9.
Timbermen in Place No. 11.

After Place No. 11 has been made safe, timbermen to follow loading machine the rest of the shift.

Bugdust to be thrown back for two cuts, when it will be loaded into shuttle cars with the loading machine.

Crew make-up to be as follows: face boss, loading-machine operator, helper, two shuttle-car operators, one car trimmer at elevator, driller, helper, two timbermen, cutting-machine operator, helper, two bugdusters and a shotfirer.

This installation was successful. Exclusive of bugdust and other impurities handled, this plan of working yielded 200 to as high as 350 tons per shift. A time study showed the following:

**Crawler-Mounted Loading Machine**

| | Minutes | Percent |
|---|---|---|
| Actual loading time..... | 247.6 | 60.93 |
| Changing shuttle cars... | 37.9 | 9.33 |
| Awaiting shuttle cars... | 63.8 | 15.70 |
| Tramming ..... | 32.0 | 7.88 |
| Miscellaneous ..... | 25.0 | 6.16 |
| Shuttle cars loaded (69 coal, 18 refuse)..... | .... | 87 |
| Mine cars loaded (91 coal, 28 refuse) ..... | .... | 119 |
| Tons of coal loaded..... | .... | 238 |
| Average time to load shuttle car, minutes..... | .... | 2.85 |
| Distance trammed, 128.8 f.p.m., ft. | | 4,121 |

Note: Two shuttle cars used.

**Crawler-Mounted Cutting Machine**

| | Minutes | Percent |
|---|---|---|
| Sumping ..... | 59.17 | 14.19 |
| Cutting across the face.. | 112.83 | 27.06 |
| Pulling out to re-sump.. | 12.33 | 2.96 |
| Re-sumping ..... | 18.33 | 4.40 |
| Changing bits..... | 58.08 | 13.93 |
| Tramming ..... | 66.50 | 15.95 |
| Miscellaneous ..... | 89.75 | 21.51 |
| Distance trammed, 50.80 f.p.m. ft. ..... | .... | 3,378 |
| Places cut..... | .... | 16 |
| Tons of coal cut..... | .... | 238 |

To summarize, our experience to date has taught us that to mechanize successfully the following points must be kept in mind constantly:

1. Natural conditions must be studied carefully before choosing the type of equipment. This applies to cutting machines, drills, loading machines, mine cars and locomotives.

2. Adequate power must be provided.

3. Before putting a mobile loader or conveyor installation in a section it first must be made ready.

4. The crew must be thoroughly organized and good supervision provided.

5. Frequent time studies must be made to correct inefficiencies.

6. The projection must be such that car changes can be made with a minimum of tramming.

7. Good maintenance of equipment is absolutely necessary.

8. The coal must be shot properly so that the loading machine can handle it without excessive digging.

9. Daily reports on performance are necessary and should be used to correct bad practices.

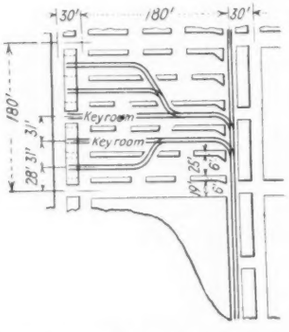



Fig. 5—Mining wide rooms with mobile loader.

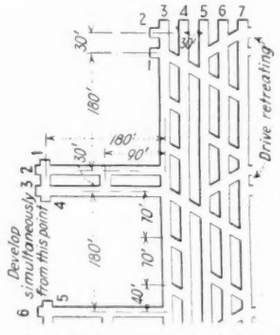



Fig. 6—Face-entry driving with crawler-type mobile loader.

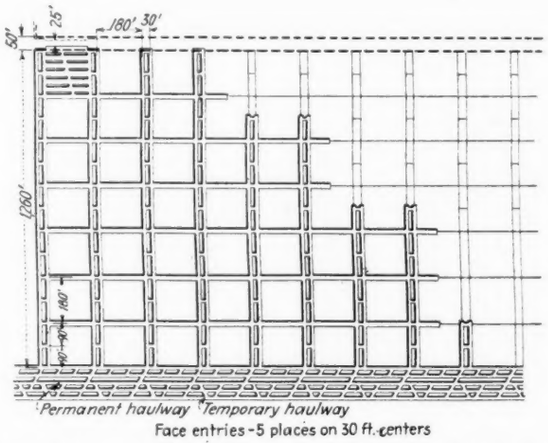



Fig. 7—Standard projection for crawler-mounted loader.

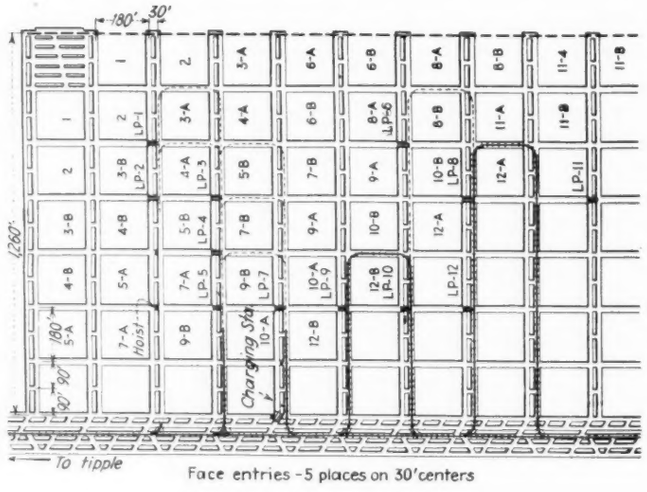



Fig. 8—Shuttle-car application.

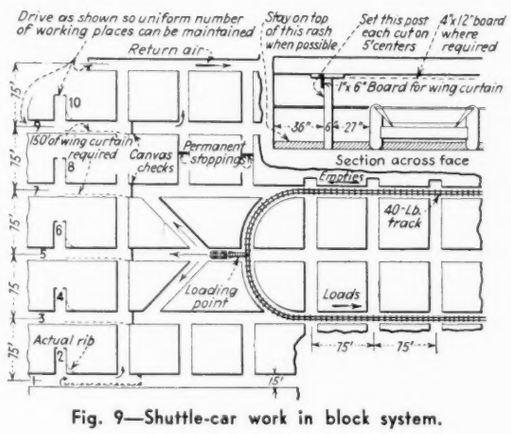



Fig. 9—Shuttle-car work in block system.

# OPERATING COSTS CUT

## At New Pine Ridge Car-Repair Shop By Introducing Unit System of Production

**Sufficient tools of the right type and the unit system of operation feature the new Pine Ridge car-repair shop of The Hudson Coal Co. This shop serves Pine Ridge and Delaware collieries, operating some 3,000 cars, and the features incorporated in its design have materially reduced the cost of operation. Experience at Pine Ridge also has been utilized to good advantage in the design of the proposed Olyphant car-repair shop.**

By R. DAWSON HALL
*Engineering Editor, Coal Age*

MOST mine shops have the necessary equipment for expeditious car repair, but usually such an inadequate quantity of these tools that repair crews have to share with one another. As a result, equipment constantly is being shifted from place to place and so often disconnected and reconnected that threads wear out, and time and patience are exhausted with no work done. Connecting hoses and electric cables are dragged over the shop floor to snarl and catch in every obstruction. Meantime, men are kept waiting to use the few tools provided.

In contrast, the new car-repair shop of The Hudson Coal Co., at Pine Ridge Colliery, Wilkes-Barre, Pa., so completely provides each of its repair crews of two men and its sill-assembly crew, also two men, with the necessary tools that the men in one crew scarcely realize the presence of the others. Each unit has its own supplies, which are stored by another crew as needed at a point convenient to the work. It has been demonstrated that each stall should be almost a complete unit and that the building should be practically the supporting and protecting covering for as many separate shops, or units, as operation of the mine may require.

However, a track for cars needing repair and another for cars already repaired, as well as an overhead traveling crane, are used in common by five crews and will be eventually by a sixth. The first track also is used by the assembly-shop crew. Yet, as two tracks seem to be more than are needed, one ultimately will be made to serve both for incoming and outgoing cars.

Two collieries, Pine Ridge and Delaware, producing 1,500 cars of coal daily (2.8 tons per car), each had its own repair shop. Pine Ridge had 1,499 cars and Delaware 1,508. Toward the close of 1940, it was decided to group these collieries together and erect a new repair shop for mine cars from both. Operation of the new shop commenced with one repair crew April 26, 1941, and not until June 16 were all five crews working. The design was regarded merely as tentative, and the findings at Pine Ridge were to set the standards for other Hudson car-repair shops. Some advocated one or two crane hoists and some a small air lift for each crew. The overhead crane was installed with the idea that if it

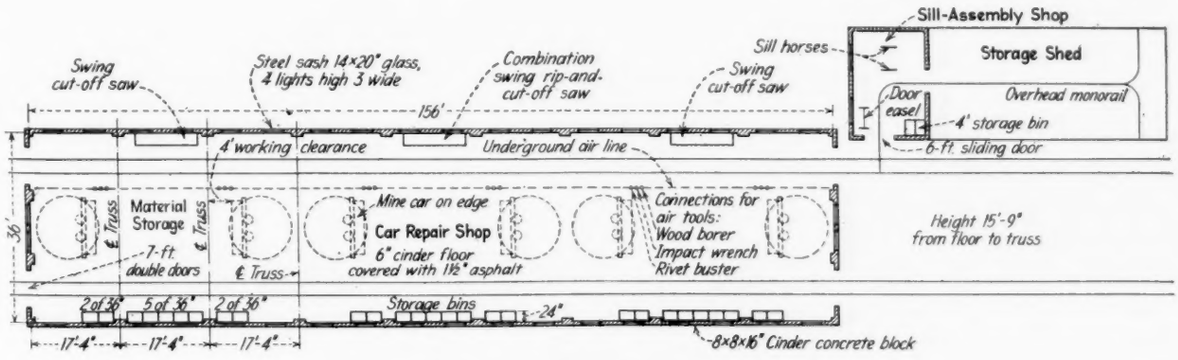



Fig. 1—Plan of the Pine Ridge six-stall car-repair shop.

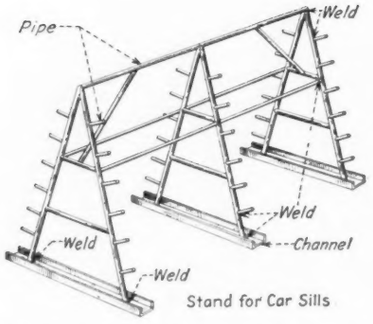



**Fig. 2—Racks welded to steel channels embedded in the shop floor make stores of car sills readily available to repairers.**

proved the less desirable, a place would be available for it elsewhere.

Six sections, all in a row, were provided in the main building, each containing an area known as a "stall," where the car to be repaired can be brought, turned over by crane, dismantled as needed, furnished with replacement parts, turned back onto the stall rails and transported to the repaired-car track. On one side of the stall, each section is furnished with mine-car sills complete with hardware placed on a big welded steel A-frame rack resting on channels and holding on six stout projecting pins an equal number of sills, "rights" stacked separately from "lefts" (Fig. 2). On the opposite side of the stall, each section is furnished with end plank, doors, crossties, center brace posts, door posts, end side posts, cross rods and axles, all stacked in orderly piles.

Along the walls on one side of the building, in Berger Manufacturing Co. small-parts storage bins, are kept bolts and other supplies for each crew, and on the other side, for general use, are two Fay & Egan 22-in. cut-off swing saws with motor drive at either end of the building and one 16-in. Monarch combination rip and cut-off saw about midway.

In one corner of each stall is a vertical 4-in. stanchion pipe welded to an 18-in. square plate sunk to the level of the 1½-in. asphalt floor of the shop (left side, Fig. 3). Hung by hooks on the open upper end of this stanchion pipe, for the use of the crew of that stall, are (1) an impact wrench for removing and tightening ½- to 1¼-in. bolts, (2) a wood borer for making $\frac{9}{16}$- to $1\frac{5}{16}$-in. holes for bolts and (3) a "rivet buster" for splitting nuts too badly rusted for the impact wrench. All (Chicago Pneumatic) are driven by air. The spikes used in the wood-floor car bottoms have a tendency to split the lumber, so a Black & Decker ¼-in. Holgun electric drill is supplied each crew to drill holes for such spikes.

These tools are kept connected to the power supply. Electric cables and air hoses are connected at a common junction at each stall set flush with the floor. They do not much obstruct operation, but suspension would be more convenient, and this is regarded as one of the advantages of dispensing with the overhead traveling crane which makes such suspension impossible within its sphere of operations.

The edge of each car rests on two rails when turned half over for repair. On the end of each of these rails is

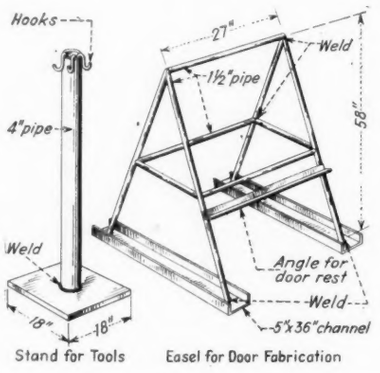



**Fig. 3—Hitching post for hanging tools, and easel for facilitating door assembly.**

bolted a bridle attached to a channel on which the rail rests. This bridle spans the top of the rail so that a wooden wedge can be driven between the bridle and the top plank so that the car will be held solidly for further operations (Fig. 4).

One stall has been provided with a 4,000-lb.-capacity Ingersoll-Rand air-operated hoist with trolley and when arrival of other equipment permits work to start in that sixth stall a comparison of speed of repair will be made possible.

Adjacent to the car-repair building proper is a separate building cornering on the larger structure so that its crew can use the ingoing track for the transport of car doors and car sills which are assembled in that building as they are received from the Providence central repair shop near Scranton, whence come also the bumper bands and door hinges and the car sills notched and drilled ready for assembly. This crew also has an impact wrench and a wood borer. Doors are not only made here but many also are repaired. From the small covered storage shed adjacent, and in line with the assembly shop comes a 2,000-lb.-capacity overhead monorail track (see Fig. 1) with hoist which eases handling of material in the shed and facilitates its transfer to the sill-assembly house. This storage shed is to be extended.

The sills are assembled on two horses of welded pipe resting in and welded to steel channels. To ease the work of drilling and bolting car doors, they are placed on an easel of 1½-in. pipe resting on 5 x 36-in. channels set in the floor (Figs. 3 and 6). The easel, made by welding, is 27 in. long and 58 in. high. As compared with working on a bench or floor it materially eases door-assembly work.

Seven types of cars are used at the Pine Ridge and Delaware collieries served by this repair shop. The different types of sills and side planks

**Table I—Car Record, Hudson Coal Co.**

| (1) Colliery | (2) Number of Cars Dumped per Repair – Major and Minor | (3)* Total Car Repair Cost per Car Dumped Between Dates Stated, Dollars | (4) Labor Cost per Car Repaired Between Dates Stated, Dollars | (5) Material Cost per Car Repaired Between Dates Stated, Dollars | (6) Labor Cost for Each Dollar of Material Incorporated in Car (4) ÷ (5) x 100 = Cents |
|---|---|---|---|---|---|
| Coal Brook, year to Oct. 31, 1941 | 55.47 | 0.15 | 3.26 | 5.28 | 61.7 |
| Jermyn, year to Oct. 31 | 36.10 | 0.13 | 2.23 | 2.38 | 93.7 |
| Gravity Slope, year to Oct. 31 | 37.95 | 0.17 | 2.83 | 5.20 | 54.4 |
| Olyphant, year to Oct. 31 | 50.33 | 0.16 | 3.15 | 4.44 | 70.9 |
| Eddy Creek, year to Oct. 31 | 79.52 | 0.12 | 4.17 | 4.96 | 84.1 |
| Marvine, year to Oct. 31 | 53.13 | 0.14 | 3.63 | 3.86 | 94.0 |
| Baltimore, year to Oct. 31 | 63.82 | 0.19 | 5.03 | 8.37 | 60.1 |
| Pine Ridge, year to May 1 | 128.91 | 0.07 | 2.37 | 4.11 | 57.7 |
| Delaware, year to Aug. 1 | 38.60 | 0.19 | 2.44 | 4.24 | 57.6 |
| All collieries to dates stated | 52.03 | 0.14 | 3.24 | 4.58 | 70.7 |
| Pine Ridge, May 1 to Oct. 31 | 72.71 | 0.18 | 3.40 | 8.47 | 40.1 |
| Delaware, Aug. 1 to Oct. 31 | 29.81 | 0.25 | 2.41 | 4.87 | 49.5 |
| Pine Ridge and Delaware to dates stated | 45.86 | 0.21 | 2.78 | 6.22 | 44.7 |

The first Pine Ridge crew started work in the Pine Ridge shop on April 26, 1941, and so the figures assume a shift from the old shops May 1. On June 4 the first Delaware crew commenced work in the Pine Ridge shop and the last Delaware man was put on Aug. 8, so, in the interest of simplicity, the date for the transfer of the Delaware men is arbitrarily set at Aug. 1.

are, separately stocked, but all crews work on all kinds of cars. This is an annoying complication, but quite usual in car-repair shops. It makes a little difficult modern streamlined factory operation, which depends so much on exact standardization of both material and performance. Some cars have steel bottoms; all have wood sides. A steel bottom will outlive, of course, many plank bottoms, and it is hoped that eventually they can be installed in all cars to materially reduce repair cost.

Hudson keeps a close record of car repairs under the following heads: cars repaired, labor cost per car, material cost, combined labor and material cost, other miscellaneous expenses and credits (which head includes lubrication), total maintenance costs, number of cars dumped, cost of maintenance per car dumped, all these both for the month and for the year to date.

On another form, the following are recorded: car complement, cars on hand, number of cars repaired (minor and major repairs separately and total), man-hours worked, man-hours per car repaired, average number of men working daily at 7 hours per day average, number of cars repaired daily and cars destroyed. Each car has its own number, which is maintained in case of transfer to another colliery.

To ascertain how much expense has been incurred in maintenance of cars, the basis taken is expense per car dumped (Column 2, Table 1). This expense is a problem of the colliery as much as the repair shop, for the colliery wrecks the cars and can increase the cost of repairs more than the repair shop can reduce them.

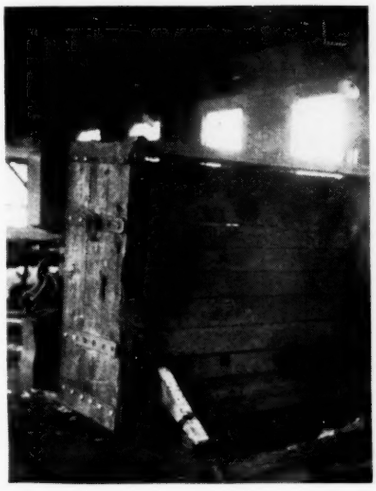


Fig. 4—Car in place for dismantling. It is held by two wedges, one of which is shown.

In assessing the labor expended in car repair in the several shops, it is necessary to remember that repairs vary from replacement of a bolt or plank to entire reconstruction and cannot be lumped together as all alike, and also that, if repair facilities at any time are lacking, major repairs may be delayed and only cars needing minor repairs will receive attention, thus lowering the costs for labor and material alike. At the Pine Ridge repair shop, a new factor for both the Pine Ridge and Delaware cars is packing the bearings with "Sponge Lube," a cellulose sponge, instead of wool waste, which temporarily is raising the cost of "repairs" both as to labor and material. Consequently, the best way, though admittedly imperfect, is to divide labor cost by cost of material per car, as in Column 6 of Table I, remembering that the lower the figure thus obtained the greater the efficiency, for it shows that less labor has been used to incorporate each dollar's worth of material in the mine car.

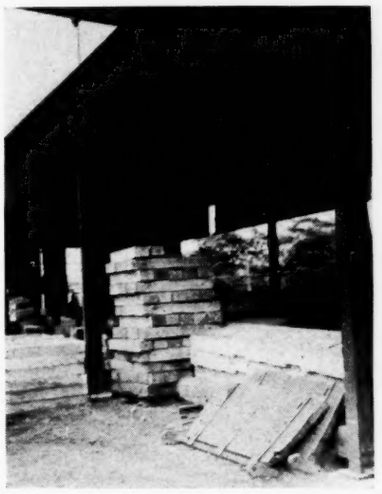


Fig. 5—Storage yard with monorail to aid in distribution.

Thus, at Pine Ridge repair shop, as the table shows, 44.7c. of labor was used for every dollar's worth of material handled, whereas at all the collieries to the dates stated an average of 70.7c. of labor was expended for every $1 of material. Thus, the record shows that the labor cost per $1 of material was 58.1 percent higher in the old plants than in the new, though costs per car dumped and actual labor and repair costs were higher at Pine Ridge because the repairs are of a major character. With the new shop, Pine Ridge and Delaware cars are rapidly being put in shape for full operation, which could not be done before for lack of facilities.

Fig. 6—Easels make door assembly easier.

Experience has shown that some changes would make the repair shop even more efficient, and the projected Olyphant shop will make much use of that experience. That eight-unit plant will take over the work of the present repair shops at Olyphant and Eddy Creek collieries. Olyphant has 2,679 cars and Eddy Creek 2,647. The shop will operate in general two shifts daily, with half sized crews from each mine working on each shift.

A single track will be laid up the center of the building with car-repair stalls on either side of the center, in each of which stalls a repair crew of two men will work. Turntable equipment will be used to direct the cars onto the stall tracks. Instead of the single Shaw-Box 4,000-lb. capacity overhead electric crane that services the five stalls at the Pine Ridge shop, four air cylinders with wire ropes and pulleys and eight pulley blocks with hooks will be provided at Olyphant. These cylinder and pulley blocks will not transport the cars, as does the electric crane, as they are designed solely to turn the cars over prior to dismantling and rebuilding and right them afterward.

Also, instead of having electric cables and hoses on the floor or suspended from above, these accessories will be mounted in spring reels on the walls of the building, much as at a garage. It will be necessary only to pull the required tool to the place of work. All other facilities for the repair of cars will be as in the Pine Ridge shop.

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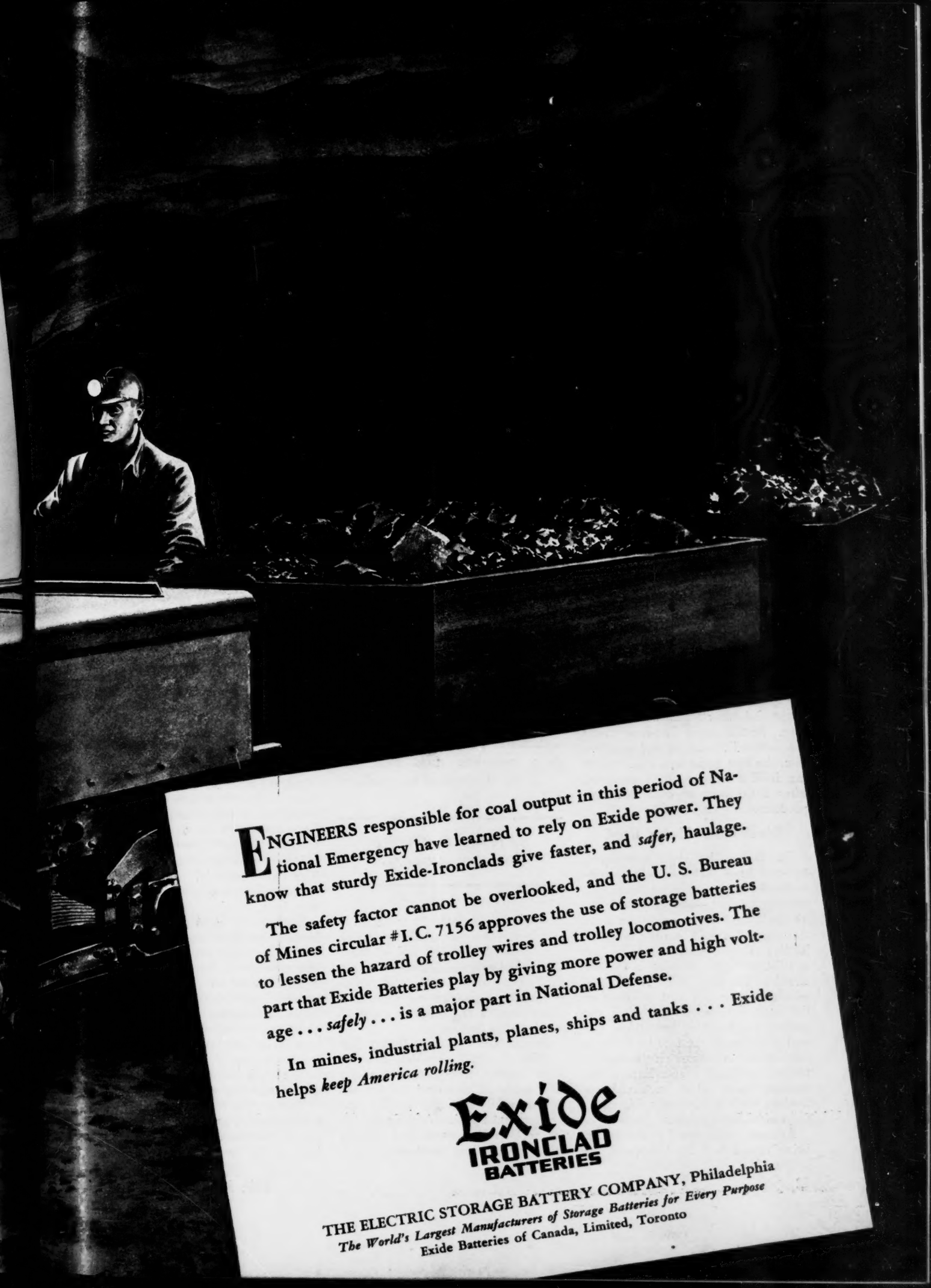

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# COMPLETELY MECHANIZED

## New Ditney Hill Slope Mine Serves Loading Machines With Shuttle Cars

**Opened by a belt slope driven by a loading machine and mine cars, the new Ditney Hill mine of the Ingle Coal Co. is completely mechanized with loading machines and shuttle cars. The coal is broken with compressed air and dust is kept down by the use of calcium chloride. The slope is protected by corrugated-steel tunnel lining, and this same tunnel lining is used in the present air and escape shaft. Exhauster equipment on the surface removes dust from the dump through a borehole.**

By IVAN A. GIVEN
*Associate Editor, Coal Age*

COMPLETELY mechanized with loading machines and shuttle cars and opened by a belt slope driven by a loader and mine cars, the new Ditney Hill mine of the Ingle Coal Co., near Elberfeld, Warrick County, Indiana, recovers 6 ft. of coal from a seam peculiar to the Ditney Hill region. Development of the operation, on the New York Central System, was featured by the use of mine labor for all sinking and construction work, including both the bottom and the preparation plant, shops, bathhouse and other facilities on the surface. Not a single lost-time injury was suffered in sinking and construction, the first (a broken ankle resulting from a slip and fall) occurring after 8,000 tons of coal had been produced.

### Steel Liner Plates Used

The Ditney Hill slope is protected by steel liner plates set on concrete footwalls, and the same lining—in this case circular—was installed in the air shaft, sunk by dropping the material through a hole into the mine for loading. Drop-bottom cars dump into a 100-ton hopper feeding a crusher ahead of the slope belt. A borehole with exhauster and dust collector on the surface removed dust from the feeding and crushing operations. The coal is broken at the face by air from stationary compressors on the surface feeding steel and copper lines to the working faces. Dust on shuttle-car haulage roads is effectively allayed by the use of flake calcium chloride.

Average thickness of the seam being mined is 7 ft. (minimum, 6; maximum, 9). Some 12 to 18 in. is left against the weak shale top, which usually is slabby and full of slips. Cover thickness varies from 90 to 250 ft. Fireclay underlies the coal, which is tough and springy and contains a "blue band" 1 to 2 in. thick about 18 in. above the bottom.

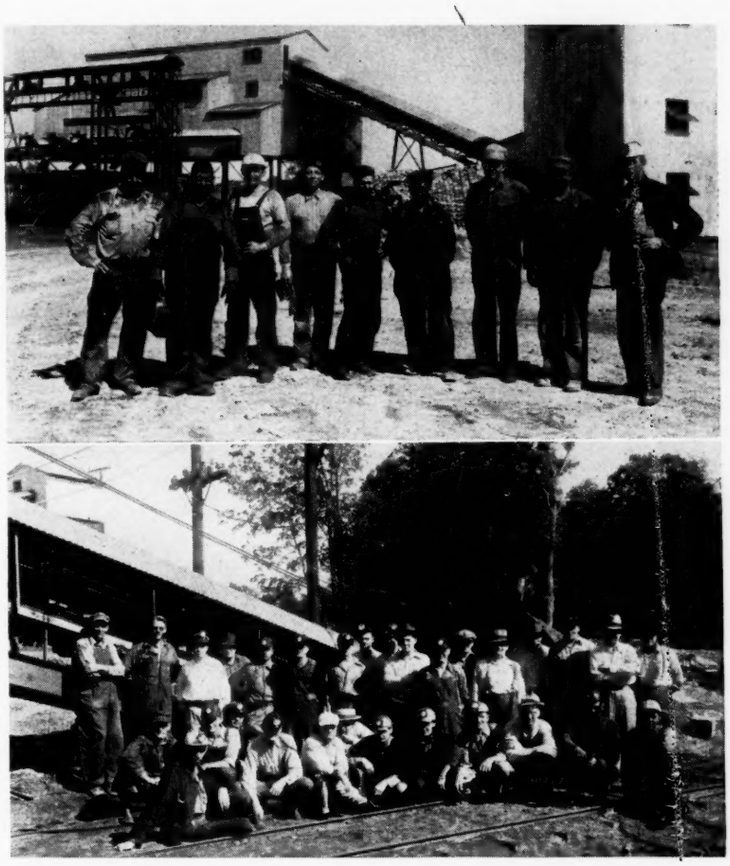
Ground was broken at Ditney Hill on Nov. 7, 1939, on which date the slope location was staked off and a start made on removing the top soil to the solid. Then the sinking and development tipple, consisting of a bin for rock and a screen and picking table for handling development coal, was built and construction of other surface facilities started. Trucks were used for hauling away the rock from slope sinking and hopper excavation, and for transporting the coal to the railroad cars.

### Slope 357 ft. Long

Length of the slope, on a 16½-deg. pitch, is 357 ft. to the bottom of the seam. Total length to the bottom of the hopper pit is 467 ft. The slope was driven approximately 18 to 20 ft. wide and 8 to 10 ft. high. Depth of the surface material at the slope location was about 12 ft. Shooting was necessary from there on, although, except for a few thin seams of sandstone, the materials encountered were soft. This made it somewhat difficult to adhere to the desired dimensions. Consequently, width and height considerably exceeded the standards in places due to sloughing and caving. The soft material also required crossbarring on 6-ft. centers all the way down.

Sinking was done by a Joy 7-BU loading machine and 5-ton A.C.F. drop-bottom cars handled by a 30-hp. Ottumwa hoist. Air was provided by a rented Sullivan gas-powered compressor large enough to supply two drills. Ventilation for both sinking and bottom development was supplied by a blower and tubing. In excavating the slope extension and hopper pit, an Imperial Bronze electrically powered compressor was installed.

Sinking was conducted on a three-shift schedule, and a crew was made up of six men, including a shift leader. The loader operator led the



Construction and sinking crews at Ditney Hill were made up of mine employees. Officials in the two groups include W. D. Ingle Jr.; Alva S. Harris, superintendent; George Warnsman, mine manager; John Bishop, night foreman; Thurlow Selby, top boss; and M. H. Dedman, mining engineer.

drilling, and was assisted by two men who also handled timbering. The other two helped out at the face until loading started, whereupon they went outside to operate the hoist and drive the truck. General supervision was exercised by the shift leader, who helped out as necessary.

On this basis, sinking was started in the rock 12 ft. down on Dec. 11, and was completed to the coal on Jan. 14, 1940. Actual number of shifts worked in the rock was 81, including timbering and all other activities.

With time out for completion of other surface construction and investigation of the possibilities of working this seam instead of another below, completion of the slope extension, excavation of the hopper pit and installation of the slope lining got under way on June 27 and was completed, including concreting, on Aug. 29, 1940.

A total of 354 lineal feet of No. 5-gage Armco corrugated-steel bituminous-coated liner plates was installed, working from the bottom of the slope to the top. This operation, which took 29 days, involved removing the wood bars and legs, setting the liner sections on low concrete footwalls 10 in. thick and backfilling over them. Some 70 ft. at the top of the slope, where the strata were especially soft, later was backed up by a sheath of reinforced concrete 18 to 24 in. thick. The completed slope has a span of 17½ ft. and is 8 ft. high at the top. It is planned to floor the slope with concrete all the way across to make a neater, more trouble-free job and help the footwalls resist any side pressures which might develop.

Excavation of the slope extension and hopper pit also was done with the loading machine and mine cars. Material removed in making the extension was approximately 300 cu.yd. Yardage loaded out of the hopper pit, a maximum of 35 ft. deep, was 395. The pit is sloped from a vertical collar on both the sides and the ends. Concrete poured in making the hopper totalled 84 cu.yd., plus 15 cu.yd. in the slope extension. An inverted steel V in the center of the hopper divides it into two sections, each opening onto one side of a double-acting plate feeder with center discharge onto the belt. This feeder, driven by a 10-hp. motor, discharges the coal into a 30x48 McNally-Pittsburg adjustable double-roll crusher driven by a 45-hp. Louis Allis totally inclosed fan-cooled motor.

Hoods over the feeder discharge, crusher opening and the point where the coal feeds onto the belt are connected to a 12-in. column line in a borehole to the surface, where a Sturtevant exhauster pulls the dust-laden air into a Buell cyclone col-

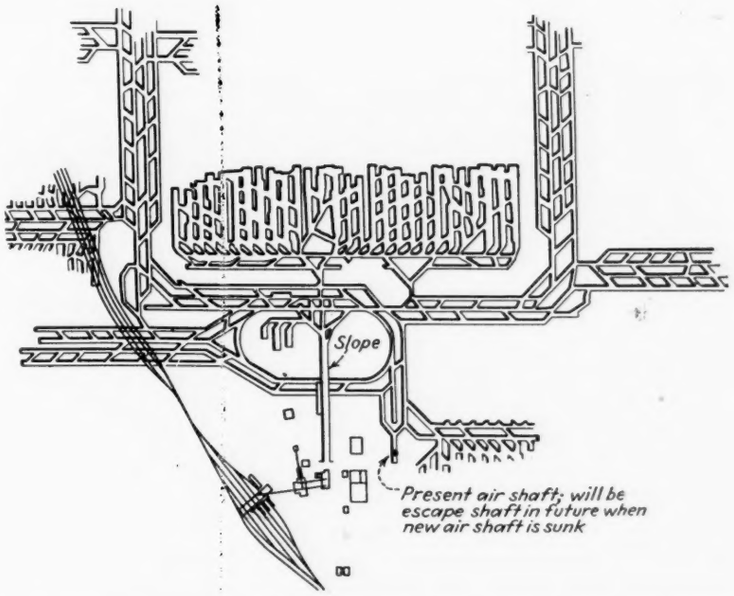
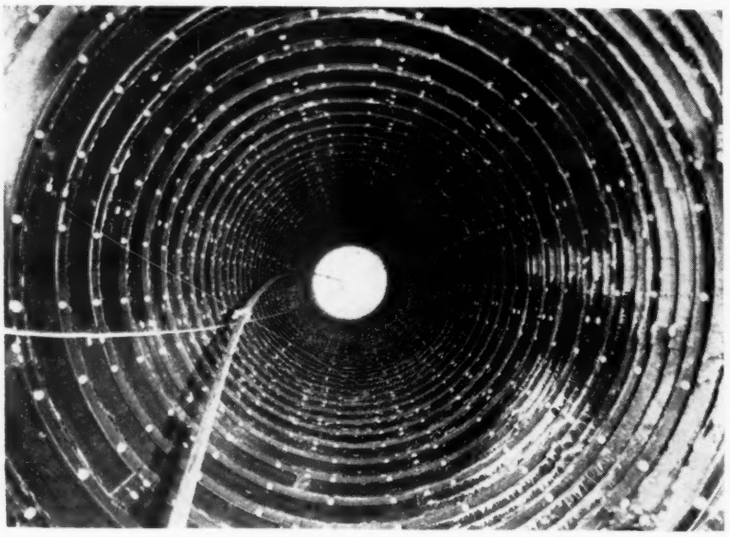



Fig. 1—Initial development at Ditney Hill mine, showing slope and bottom layout.

Main lines at Ditney Hill are laid with 60-lb. rail on creosoted ties. Joints are bronze welded.

Looking up the slope, showing the steel tunnel lining and belt conveyor.



This view from the bottom of the air shaft shows another use of steel lining.

lector. This dust may be sold if a market is available. Otherwise, it will be used in the Iron Fireman spreader-type stoker under the preparation-plant heating boiler.

After passing through the crusher, the coal is hoisted to the surface on a Robins conveyor (Timken-bearing one-shot-lubrication idlers) fitted with a 36-in. Goodrich "cord" belt (two 42-oz. duck plies, three cord plies, $\frac{3}{16}$-in. rubber cover on the carrying side). Total belt length is 1,070 ft. Total conveyor length, center to center of pulleys, is 506 ft. Rated capacity is 250 tons per hour. The conveyor is driven by a 60-hp. Louis Allis motor and is paralleled by a materials track on the opposite side.

Development of the bottom as conditions permitted accompanied work on the slope extension and dump hopper. Early activity was based on loading directly into cars which were hoisted to the surface. By Oct. 8, 1940, things were far enough along for the first shuttle car to start, dumping directly into the hopper. Operations at this stage were concentrated on driving around to the air-shaft location in preparation for sinking.

## Pilot Hole for Shaft

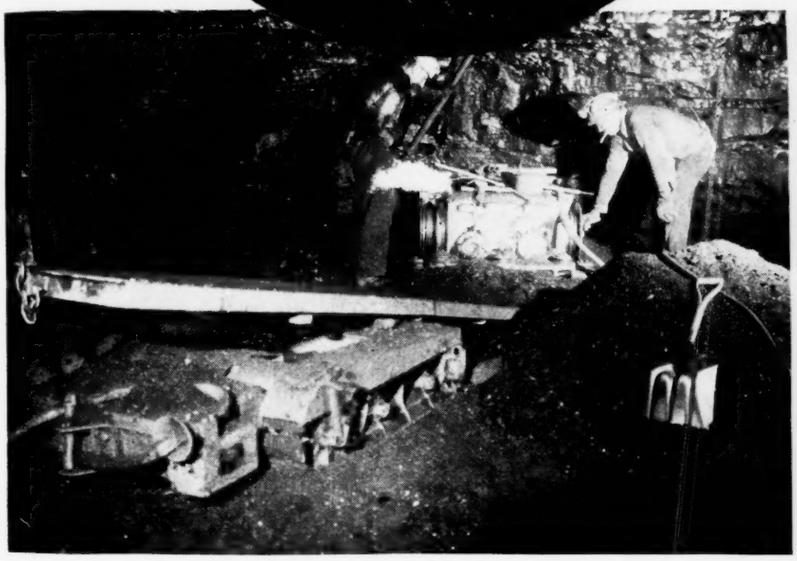
To facilitate this sinking, a 12-in. drillhole was put down and a pothole shot in the mine roof. Subsequent operations, carried on by three men, consisted of drilling, shooting and mucking, pushing the spoil down the drillhole into the mine, where it was allowed to accumulate for two shifts. On the third shift, a Joy came in and loaded the spoil into shuttle cars, which were dumped through the hopper onto the slope belt.

Depth of the air shaft is 90 ft. and it was completed in nine three-shift days, including installation of the circular steel lining. Shaft diameter is 8 ft. Plans are made for sinking a similar air shaft 140 ft. deep about 3,000 feet east, after which the original air shaft will serve as an escape shaft.

Production equipment at Ditney Hill comprises Joy 7-BU and 11-BU loading machines, Joy 42-D6 6-ton shuttle cars powered by 350-amp.-hr. Exide-Ironclad, Philco and Gould batteries; Joy elevating conveyors for loading mine cars, Sullivan 7-B "Super" and CR-3 shortwalls with 8½-ft. bars; Joy T1-1E crawler-mounted shortwall trucks, Dooley 473 post-mounted coal drills, 5-ton A.C.F. Timken-bearing drop-bottom mine cars and (at present) 6- and 8-ton Goodman locomotives for the run from

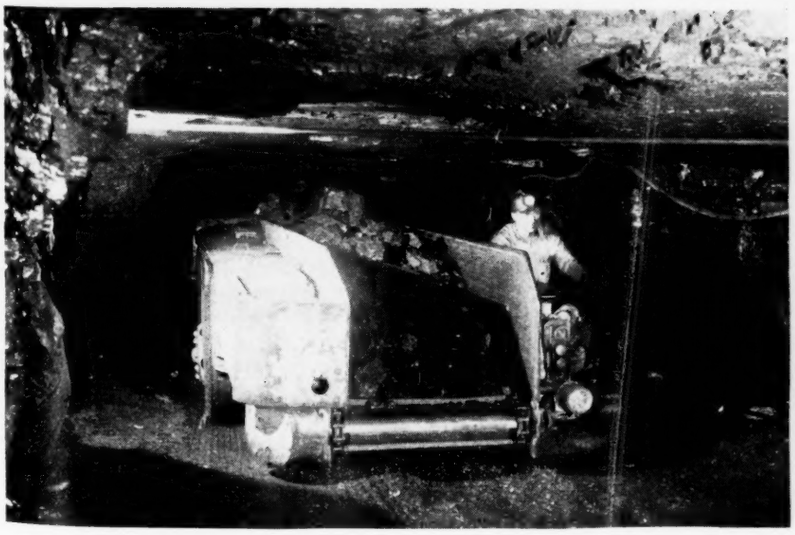
Showing bottom half of a room face broken down with air.

Drilling a hole in a room face just above the blue band.



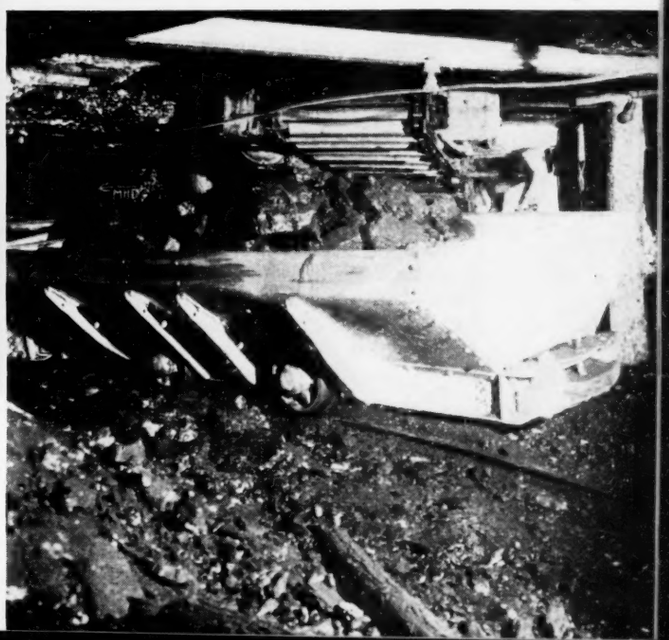
With the undercut completed, the crew is preparing to load up a shortwall machine.

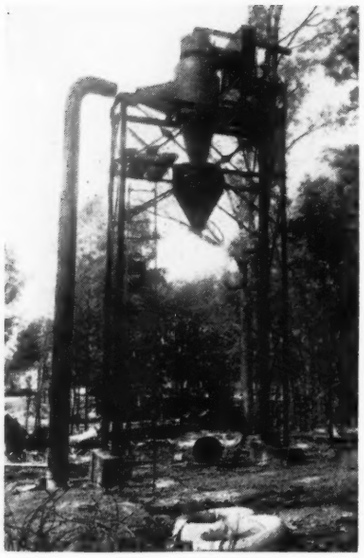
High-capacity loader bailing up room coal.



Shuttle cars operate on roads treated with calcium chloride to keep down dust.

Last car in a trip under the elevator at the transfer station.





Shown here in the course of construction, this exhauster and cyclone collector remove dust from feeding and crushing operations on the bottom.

elevating conveyor to dump hopper at the bottom of the slope.

The shortwalls use Cincinnati "Duplex" bits, which are made from bar stock at the mine, using the machine originally purchased for the company's Wick operation. Since cutting is not difficult, bit consumption is less than half what it was at Wick. Drills are equipped with Hardsocg augers, cutting heads and bits. The coal is broken with Airdox, using three stationary compressors on the surface, with steel lines to the territories terminating in copper tubing to the faces. Present plans call for keeping the compressors on the surface and carrying the main lines into the mine by means of drillholes.

The executive and operating staff at Ditney Hill, which still is developing up to an average output of 1,800 tons per shift, with 2,000 tons as the maximum, includes David Ingle, Sr. and Jr.; W. D. Ingle, Sr. and Jr., Alva S. Harris, superintendent; George Warnsman, mine manager; John Bishop, night foreman; Thurlow Selby, top boss, and M. H. Dedman, mining engineer. Edison Model P electric cap lamps are used, with hard hats, safety shoes and other protective clothing.

Development at present is based on four-heading main entries. Room territories are opened with two headings, which then are increased to four. Entry width is 10 ft.; centers, 35 ft.

The panel system of extraction is employed, with the room territory surrounded by a solid pillar except where the headings cut through. A group of five to seven rooms on one side of the entry comprises a territory for a production machine, with four headings and the necessary crosscuts and other openings as the territory for a development unit. Rooms are driven 24 ft. wide on 36-ft. centers; usual depth is 250 ft. They are necked on a 45-deg. angle for a short distance, these necks as well as later crosscuts being angled to direct the shuttle cars to the transfer station, which is arranged so that mine cars come up one heading, cross under the elevator, go down another heading and then cross back to the original opening, thus making a complete circle. Using Airdox permits a continuous operating cycle, and thus territories of the size noted can supply all the coal a loading machine can handle.

A mechanical-mining unit includes a loading machine, two shuttle cars, elevating conveyor, cutting machine with truck, and drill. The crew for a room unit is made up of a loader operator, two shuttle-car drivers, two cutters, two drillers, one shooter, two timbermen—one doing clean-up work—and one motorman who works back and forth from bottom to elevator. One boss normally takes care of each unit. To date, with the mine still in the development stage, room units are producing 400 to 500 tons per shift with a 6-ft. working height. Sight lines are carried 4 ft. from one rib and the practice is to timber on one side only with at least two rows of single posts. This has been found most convenient under Ditney Hill conditions, in addition to reducing breaking of the top, since this system brings at least one row of props to the center of the place.

Room faces 24 ft. wide are broken with nine holes drilled about as shown in Fig. 2. Bringing the top rib holes in as indicated results in an arched effect and eliminates the tendency of the air to peel down the top coal. Headings 10 ft. wide are broken with seven holes (Fig. 2). In either case, one row is drilled just above the blue band to break it up and throw out the bottom bench. Breaking pressures range from 9,000 to 10,000 lb. as a general rule.

Shuttle-car roads are "seeded" at intervals with Solvay flake calcium chloride, which has been found to eliminate flying dust entirely. The effect is to keep the road moist, so that the fine coal packs down under the tires and makes a good track. A ridge builds up in the center as the road is used but remains moist and will not give off dust. At intervals, the roads are dragged, using a shuttle car for pulling power, which is followed, if necessary, by another application of calcium chloride, whereupon the coal in the tracks immediately packs down again to a firm base. Aside from dragging and reworking, the rule is that as soon as dust begins to fly the area is treated to another dose of chloride, which may be thrown on with a shovel or put on by a grain-type "seeder."

To serve the working sections, Ditney Hill is equipped with 60-lb. main lines laid on 4x6-in. creosoted ties (Republic Creosoting Co.). All joints are welded by the "Airco" process, using No. 27 manganese-bronze rod. Cost of such a joint, when a welder is working steadily on a relatively long stretch of track, is $1.80 to $1.90, including labor, rod and gas, but not power. West Virginia track materials are employed, with Ohio Brass overhead line materials.

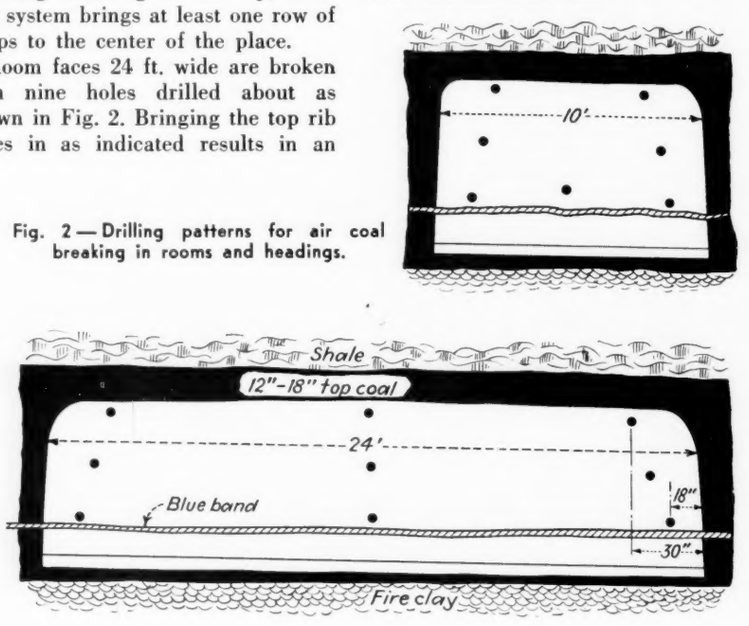



Fig. 2 — Drilling patterns for air coal breaking in rooms and headings.

# CONVEYOR SUCCESS

## As in Any Mechanical Work Depends Upon How Management Does Its Job

**With mechanical mining showing steady gains, conveyors are being adopted by many operators as the first step in that direction. While natural conditions play a role commensurate with their favorable or unfavorable aspects, the success or failure of any attempt at mechanical mining depends upon the mine management. Close supervision, attention to detail, and foresight are essential.**

By THOMAS QUINN
*President, Quinn Coal Co.*
*Portage, Pa.*

IT IS A MATTER of general knowledge among coal men that within the last few years giant strides have been taken in the direction of mechanical mining. As this method of mining, under favorable conditions, means reduced cost, I believe that there is no doubt that hand loading in mine cars will be almost a thing of the past in the course of a few years. As the first step in this direction many operators who are naturally cautious, and wisely so, are experimenting with different types of conveyors rather than with the more expensive loading machines.

Thickness of the seam; the presence, location and quantity of impurities; roof and bottom conditions, grades, etc., all have a direct bearing on just what type of mechanization, if any, would be adaptable to any particular mine. Some mines where natural conditions are favorable are doing exceptionally well while others where conditions are unfavorable have not been so successful. Some operators are doing remarkably well under trying conditions, while others under more advantageous circumstances are floundering about.

The success or failure of any experiment depends largely on the management. The type of supervision which would be considered adequate in a hand-loading mine would certainly fall considerably short in a mechanized mine. Mechanized mining calls for close supervision, attention to detail, and plenty of foresight. In this method of mining, where the working faces advance so rapidly, it is absolutely necessary to know at all times what is to be done next and how it is to be done. Where all employees are paid on an hourly basis, delays are considerably more costly than in a hand-loading mine where a tonnage rate is used.

Every man in a conveyor set-up has a particular job and is due to be performing his task in a particular place at a definite period in the cycle. Where this is done, everything moves efficiently and production reaches its maximum. But where the work is done in a haphazard manner with no attention to assigning particular jobs to individuals, then inefficiency creeps in. It is really surprising what practices are tolerated in mines striving to get cheaper coal by mechanized means.

To get maximum production, empties must be available at the loading point at all times. I have been in a mine, however, operating 100 per cent mechanical, where as much as two hours has been lost in one working shift awaiting empties. At this particular mine this is a common occurrence. The management assumes, of course erroneously, that this does not have any bearing on production, inasmuch as those at the face have tasks which they can perform during this period. To be successful with any type of mining, one must assume that all delays are costly. Double shoveling on hand-loaded conveyors must be avoided. If pan lines are properly elevated and blocked with wood, not gob, cleaning along lines will be unnecessary. As a general thing conveyor chains do not break. Instead, they come in two because some one neglected to use cotter keys or failed to spread those used. Conveyor chains have a definite number of flights and links and there is only one correct way to assemble them. To deviate from this is to invite trouble.

The use of steel pins was sanctioned by the manufacturers only to replace the ordinary shear pins in the event of an overloaded conveyor. It is a common practice at some mines to use them at all times when the ordinary pin shears. In the event the flights are out of place, which often is the case, it invariably ends with more flights out and bent. It would be much more sensible to ascertain the cause of the trouble and correct it at once. Any other procedure should not be tolerated. Under the circumstances it certainly would be economical to forbid the use of steel pins at any time.

Plenty of fresh air at the working faces at all times is of vital importance if maximum efficiency is to be attained. Frequent and adequate lubrication of all bearings cannot be neglected. Don't overlook the fact that, aside from the humanitarian angle in accident prevention, it also is a good business practice which pays big dividends.

[CONCLUDED FROM DECEMBER, 1941, ISSUE OF COAL AGE, P. 80

# SIGNPOSTS TO SAFETY SET UP BY BOARD DECISIONS

*Decision 21—Setting Posts in Main Haulageways, Slopes and Inclined Shafts. Sept. 8, 1932.*

In the interest of safety in underground mining, the U.S. Bureau of Mines recommends that in slopes or inclined shafts which are so steep that fallen material may roll or slide, and in main haulageways, posts supporting the roof or sides should be set in protecting niches in the wall. Where this is not practicable, substantial guard rails should be placed along the posts.

*Decision 22—Sealing or Guarding Surface Openings. Sept. 8, 1932.*

In the interest of safety in underground mining, the U. S. Bureau of Mines recommends that:

1. All surface openings to underground workings not necessary for the operation of the mine or for escape, which are not adequately ventilated, timbered, and regularly inspected, should be kept securely closed to prevent unauthorized persons entering and surface fires from extending underground; and

2. All openings necessary for operation or escape should be guarded against the unauthorized entrance of persons.

*Decision 23—Checking Men In and Out. Sept. 8, 1932.*

In the interest of safety in underground mining, the U.S. Bureau of Mines recommends that every underground mine should keep a record in a safe and quickly accessible place on the surface, which will show the time when each person goes into and when he comes out of the mine, and which will also show, insofar as practicable, where he may be found while in the mine.

*Decision 24—Guarding Trolley and Bare Power Lines. April 11, 1933.*

In the interest of safety in underground mining, the U. S. Bureau of Mines recommends that:

1. Trolley and other bare wires should be adequately guarded wherever the wire is less than 6½ ft. above the level of the top of the rail.

2. In mines using loading chutes on one side of the haulageway, the trolley and other bare power wires should be placed on the opposite side and adequately guarded at the chute.

3. Trolley and other bare power lines should be sectionalized by electrical switches which can be safely handled, at the entrance to different parts of the mine; and

4. Trolley and other bare power lines should be adequately supported by strong, insulated hangers so spaced that if a hanger is missing the wires will not sag or shift and thus constitute a hazard.

*Decision 25—Barrier Pillars Between Mines. Feb. 3, 1933.*

In the interest of safety in underground mining, the U. S. Bureau of Mines recommends:

1. That every mine contiguous to one or more mines in the same vein or bed should, so far as practicable, have separate ventilation, haulage, and escapeway systems, and the underground workings of each mine should be separated by a strong barrier pillar to prevent a fire or an explosion penetrating from one mine to another. Provision should be made to relieve excessive pressure of accumulated water on one side of the barrier.

2. In case mines already are connected and thereafter it is practicable to provide satisfactory separate ventilation, haulage, and/or escapeway arrangements for each mine, a barrier pillar should be established and the openings which connect the mines should be sealed by strong, tight, fireproof stoppings or pack walls.

3. The barrier pillar should be maintained intact until the workable mineral has been completely removed from the contiguous workings; then, if permitted by the respective State requirements and property restriction, and if it can be done with safety, marketable mineral in the barrier should be extracted.

*Decision 26—Allaying Dusts Harmful to Breathe. June 2, 1934.*

In the interest of health in mining and tunneling wherever dust is produced which is of such character[13] and in such concentration[14] in the air of the working places as may be harmful to breathe, the U. S. Bureau of Mines recommends:

That the dust produced be so wetted,[15] trapped,[16] or

[13] Character of dust refers to size and composition, such as siliceous dusts and other dusts poisonous in effect.

[14] Concentration of dust in air refers to amounts, varying with the character, that will be harmful to breathe. The determination of the amount for each specific dust and the method of sampling are subjects of research by the U. S. Bureau of Mines in cooperation with the U. S. Public Health Service. Reports and tentative recommendations on these subjects are issued from time to time by these organizations.

[15] "Wetted" means as may be done by sprays or jets of water or chemical solutions. In drilling, the wetting in the drill hole may be done by water-injection drill or solution-injection drill.

[16] "Trapped", as may be accomplished by suction of the dust-laden air and collecting the dust in an apparatus of one kind or another.

otherwise treated[17] and the place where men are working be so ventilated[18] that there shall not be a harmful concentration in the air of the place.

*Decision 27—Smooth Fireproof Shaft Linings. July 13, 1935.*

In the interest of safety, the U. S. Bureau of Mines recommends:

1. That the lining of all mine shafts shall be fireproof.[19]

2. That the lining, so far as feasible, be smooth and without projections or recesses, so as to prevent:

(a) Turbulence of the ventilating current;
(b) Accumulation of dust, especially inflammable dust;
(c) Lodgment of rock or other material.

*Decision 28—Safety Catches and Arresting Devices. Jan. 17, 1938.*

In the interest of safety in mining, the Bureau of Mines recommends:

1. That cages or skips used for hoisting or lowering men in vertical and steeply inclined shafts shall be provided with safety catches designed to prevent falling of the cage or skip if the hoisting rope or other connections break; and

2. That cars used for hoisting or lowering men with ropes in slopes shall be provided with arresting devices, other than ordinary brakes, that come into action if the hoisting rope or other connections break.

*Decision 29—Ventilating Doors. April 5, 1938.*

In the interest of safety in underground coal mining, the Bureau of Mines recommends:

1. That doors used to control ventilation

(a) Shall be installed in pairs to form air locks,
(b) Shall be self-closing,
(c) Shall not have latches or other devices for holding them open.
(d) Shall be constructed and maintained to prevent excessive air leakage through or around them.
(e) Shall be fire-resistant.

2. That wherever practicable the use of doors shall be limited to development openings.

*Decision 30—Main Fans. Jan. 11, 1939.*

In the interest of safety in coal mining, the Bureau of Mines recommends that all active underground coal mines, whether working or idle, have one or more fans in continuous operation. The capacity and installation shall be such that the entire mine workings are adequately ventilated at all times. Main fans shall be located on the surface in fireproof housing offset from the line of any mine opening. The housing shall be provided with ample pressure-relief doors or other devices easily opened by the force of an explosion. The installation shall permit prompt reversal of air flow. For mines that liberate gas, the fan shall have at least two independent sources of power immediately applicable.

[17] "Treated," as may be done by chemical solutions applied, as stated above, by sprays, jets, or injection drills.

[18] "So ventilated" means by air currents of sufficient velocity and volume to carry away from any working place harmful dust not caught by wetting or by trapping devices and, wherever possible, discharged into the return airways.

[19] Webster's dictionary (1924) defines "Fireproof: proof against fire: relatively incombustible."

*Decision 31—Applies only to metal mines.*

*Decision 32—Rock-Dusting. Feb. 20, 1940 (supersedes Decision 5).*[20]

To prevent the propagation of mine explosions, the Bureau of Mines recommends:

1. That all coal and lignite mines, except anthracite mines, shall be rock-dusted.

2. That rock dust shall be distributed upon top, bottom, and sides of all underground openings of every description, to within at least 40 ft. of all working faces, and the areas not rock-dusted shall be kept wet.

3. That the rock dust shall be maintained in such quantity that the incombustible material in representative samples of dust collected shall not be less than 65 per cent. Where methane gas is present in the ventilating current, the minimum percentage of incombustible matter in the mine dust shall be increased 1 per cent for each 0.1 per cent of methane.

4. That when the rock dust in any area becomes caked so that it cannot be dispersed readily as a cloud in the air, that part of the mine shall be redusted immediately.

5. That the dust to be used shall not contain more than 5 per cent of combustible matter nor more than 25 per cent of quartz or free silica; all of the dust shall pass through a sieve having 20 meshes per linear inch and 60 per cent or more shall pass through a sieve having 200 meshes per linear inch; the dust shall not absorb moisture from the air to such an extent as to cake and destroy its effectiveness as a dry dust.

6. That rock-dust barriers shall not be regarded as a substitute for generalized rock-dusting.

*Decision 33—Defining Gassy Coal Mine. Feb. 10, 1941 (supersedes Decision 3).*[21]

The Bureau of Mines believes that all coal mines are potentially gassy. For the purpose of administration in the prevention of explosions and fires, the Bureau recommends that any coal mine wherein methane or other combustible gas can be detected in amounts as much as 0.25 of 1 per cent or more by frequent systematic searches shall be classified as a gassy mine.

[20] The original decision, approved April 7, 1927, was as follows:

"To prevent the propagation of mine explosions, the U. S. Bureau of Mines recommends rock-dusting all coal mines, except anthracite mines, in every part, whether in damp or dry condition. It also recommends that rock-dust barriers be used to sectionalize the mine as additional defense, but these should not be regarded as a substitute for generalized rock-dusting.

[21] The original decision, approved May 8, 1926, was as follows:

"The U. S. Bureau of Mines believes that all coal mines are potentially gassy, but for purposes of administration in respect to prevention of explosions and fires the Bureau recommends the following classification:

"Class I Coal Mine—A practically non-gassy mine in which inflammable gas in excess of 0.05 per cent cannot be found by systematic search.

"Class II Coal Mine—A slightly gassy mine in which:

"(1) Inflammable gas has been found but in amount less than 2 per cent in still air in any active or unsealed abandoned workings, or

"(2) Inflammable gas can be found but in amount less than 4 per cent in some place from which the ventilating current has been shut off for a period of one hour, or

"(3) Inflammable gas can be found but in amount less than ¼ per cent, in a split of the ventilating current, or

"(4) Inflammable gas enters a split of ventilating current at a rate of not more than 25 c.f.m.

"Class III Coal Mine—A gassy mine in which inflammable gas is found in amount greater than specified for a Class II coal mine."

# FOREMEN'S QUESTION FORUM

## Hows and Whys for Safe Operation Of Shuttle-Car Haulage *

By G. A. SHOEMAKER
*General Superintendent*
*Union Collieries Co., Renton, Pa.*

SHUTTLE cars can be operated successfully only where conditions are favorable. The remarks that follow will be based on experience in the operation of cable-reel shuttle cars in the Renton No. 3 mine, operating the Thick Freeport seam under a cover varying from 300 to 700 ft., using the room system of mining with pillars extracted by open-end cutovers.

A hard, fairly dry, incombustible bottom without excessive gradients is ideal for trackless mining, whereas a soft friable floor may make tramming difficult and dangerous. Local soft spots and holes gather water and get deeper, increasing trailing-cable hazards. In general, operation of shuttle cars on a coal bottom is of doubtful advisability, especially where ribs are being extracted and the bottom tends to break.

### To Preserve the Surface

*Protecting the Roadways*—To control the bottom, (1) good drainage is essential, properly placed sumps will prove helpful if water is present; (2) systematic application of sufficient water to bottom where it is too dry and dusty will promote cohesion that will give a hard road and allay dust; (3) complete extraction of coal, including all stumps, is imperative, thus avoiding weighting and heaving of bottom. If coal is to be left, enough should be present to prevent heaving; (4) pneumatic-tire mountings properly designed have been helpful, because caterpillars destroy the coal bottom; (5) uniform routing of shuttle cars from faces to nearest possible loading point is desirable so that each room or crosscut will carry only its normal coal quota. Shuttle cars traveling long distances partially replace "intermediate haulage" and necessarily must travel fixed routes which may become hazardous because of excessive use.

*Care of Roof*—On curves, set timber legs in protected positions, and on straight runs put them well in the clear. Have standards wherever roof is bad. Drive places on sights. Rapid development makes it possible with trackless mining to delay the driving of rooms, so that pillars will have to stand for only a short time, and, if falls occur, it is easy to work round them and thus more completely remove irregular pillars.

*Keep Dust Under Control*—Water for sprinkling and cutting-machine tanks is piped to all trackless sections from a central hydro-pneumatic pump station from a sump on the main face entries, with pressure automatically kept nearly uniform. About 14 in. of a middle band cut from the seam is loaded separately. Sprinkling of cutter bar allays the dust, not only in cutting but also in loading. When necessary, the coal is sprinkled also when being loaded into coal cars.

Where the floor is dry, it is sprinkled once or twice a week. If coal has been crushed, rock dust is added. Coal is mined down to the fireclay so that any material that works loose from the bottom adds to the incombustible in the road dirt. The coal is gathered carefully from the front of the face to avoid an excess of dust back from the mining area. Occasionally, coal must be removed from the roadway, especially at curves, but this is readily done with loading machine and shuttle car, thus trackless sections can be kept cleaner than tracked sections, for there the floor has to be cleaned by hand shovel.

**Table I—Percentages of Incombustible Dust at Renton No. 3**

| Percentage of Incombustible Dust | With Track | Trackless |
|---|---|---|
| *First Operating Day* | | |
| Average roof and rib samples | 68 | 65 |
| Average floor samples | 34 | 57 |
| *Last Operating Day After General Weekly Rock-Dusting* | | |
| Average roof and rib samples | 85 | 71 |
| Average floor samples | 40 | 73 |

Note that the floor samples in the trackless sections are definitely higher in incombustible matter and can be so maintained, though in spots the average may be exceeded.

*Ventilation*—Exercise care lest shuttle cars tear down line brattice. In retreat, deflecting doors and brattices may be necessary for effective ventilation of working faces and gob line. Shuttle cars may have to be passed through doors.

*Design of Shuttle*—With four-wheel steering, loads per unit can be increased 1½ tons without increasing the turning radius. For operative of shuttle car provide adequate driving space, protected from rib and with motor control, steering wheel and brakes that will permit of safe operation. For heavy loads, power steering probably would afford better control. As the wheels of cable-reel rubber-tired equipment are insulated from the floor, its frame should be provided with a separate electrical ground. A three-conductor cable has been designed with no increase in diameter due to the addition of this third conductor.

*Cutters for Trackless Mining*—In general, shortwall undercutter trucks are adapted readily to caterpillar or rubber-tired mounting, but the problem is more acute with center, top or universal cutters, which weigh from 10 to 13 tons and have running gear equipped for high sumping and tramming speed and flexible enough for safe maneuvering. The first caterpillar-mounted universal cutters ran into mechanical difficulties and damaged the fireclay floors, particularly at curves and wet places. Such a machine ran its cutter bar first almost against the floor and then against the roof.

Mounting the unit on rubber tires improved the mechanical and the safety features of the equipment. Rubber tires pack rather than dig up the floor and tram with a high degree of safety. Two such center cutters are satisfactorily operating. All the rubber-tired cutters at Renton have large-capacity water tanks and pumps for cutter-bar sprinkling. They maneuver well and are easy to handle.

### Protect Conductor Cables

As in track sections, post drills are used and grounded with a three-conductor cable. Machine cables with shuttle cars are particularly dangerous, strange to say, because they may be run over without causing an immediate cable failure. Unless a special effort is made to prevent it, drivers will overrun cables promiscuously, a very dangerous practice. Cables should be suspended from roof or rib where shuttle cars are traveling or where one piece of equipment is likely to pass over the cable of another. It might be best to inflate pneumatic tires for such use with carbon dioxide. To avoid unnecessary tangling and overlapping of cables, positive and return wire should be located, where possible, on the room-neck side of the butt entry and hung in an approved manner.

*Auxiliary Equipment*—Over weekends a small rubber-tired hand-propelled rock duster is used in the shuttle-car sections, but, during the rest of the week, rock dust is maintained at the faces by hand. A small motor-driven air compressor, transportable on a locomotive, inflates the tires.

Trackless mining (1) simplifies the face-preparation cycle by eliminating trackwork, decreases confusion and helps to keep places in proper working cycle; (2) removes or greatly simplifies the complicated railroading job involved in moving coal from face to tipple; (3) eliminates car handling at working places, which, in tracked sections, is one of the most hazardous operations in the mechanical-loading cycle; (4) makes it

* Abstract of article, entitled "Safety Problems in Connection With Operation of Rubber-Tired Shuttle Cars," presented at the meeting of the Coal Mining Institute of America, Dec. 12, 1941.

unlikely that anyone will be in a hazardous position alongside or near the end of the loading boom, as no snapper is required and the shuttle-car operator is on the outby end of the shuttle car beyond the reach of the boom; (5) by its relative flexibility it eases access to all ribs and stumps and thus promotes their complete extraction with a resulting improvement in break-line conditions; (6) eliminates most of the derailment hazards and those of the hand tools and heavy lifting that are inevitably associated with track laying and recovery, also the breaking loose of mine cars, which too often run to working faces, jeopardizing lives of men working in such places. Foremen like trackless mining, as they can mine more tons per lost-time accident and simplify operation, giving them more time for constructive safety supervision.

Basing figures only on the accidents occuring in the sections considered, statistics have been as in Table II.

**Table II—Lost-Time Accident Record at Renton No. 3 With Track and Trackless Mining**

| | Track Mining | Trackless Mining |
|---|---|---|
| Tons mined | 1,298,884 | 433,176 |
| Lost-time accidents | 52 | 9 |
| Tons per lost-time accident | 24,978 | 48,131 |

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# How, While Still Using Standard Equipment, To Lift 220-Volt Secondaries to 254

By **FRED W. RICHART**
*Editorial Staff, Coal Age*

DIFFICULTIES hamper the present application of a.c. power to coal-mining equipment, and British practice may suggest ways in which, while still using standard American equipment, these difficulties may be avoided. Up to 1928, England had a conglomeration of voltages and frequencies. The government then took the matter in hand and, with public funds, established transmissions and interconnections which tied together the several plants and systems of the industrial area of England in a unit known as the "Grid." For this, 50 cycles was adopted as the standard frequency.

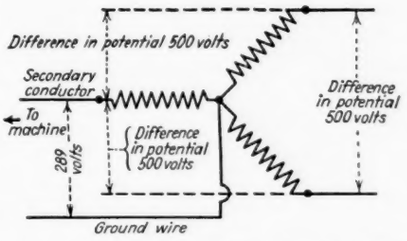
For mining purposes, 500 was chosen as standard voltage, but it was required that a ground wire be carried along with the power wires. With a 3-phase Y-system, this would limit the voltage to ground to 289, which is only 5 per cent above the 275 volts allowed in most States for bare trolleys.

First let us recite present mine practice. In the United States, because we are sticklers for interchangeability of motors for all purposes, and because the standard provides no step between 220 and 440 volts a.c., and because of our 275-volt limit, 220-volt secondary a.c. is used underground, though some mining companies in this country have had transformers with 275-volt secondaries built specially for them. In the United States, rarely is a ground wire used for our 220-volt underground mining equipment, although most power companies ground the middle tap of the transformers that supply our homes.

Furthermore, at most new coal washeries 440-volt motors are used, because control is cheaper and wiring costs are lower than with the 220-volt a.c. motors used underground. Practically all general-purpose motors can be connected for 220 or 440 volts, using only screw driver, pliers and tape; thus standard motors bought for surface use could be used below ground, provided that the motors and their controls were weatherproof. It is becoming general practice to use such weatherproofed units above as well as below ground, and thus these motors might be installed underground except in gassy atmospheres or under certain difficult conditions.

Now for the suggestions:

1. We can adopt 440 a.c. current for the secondary underground voltage, use motors Y-connected internally and have the Y-point brought out for ground and cable connection. In that event, voltage to ground will be 254, which is well under 275.




**A Y, or Star, Connection for Three-Phase Operation**

The conductors are 120 deg. out of phase with each other; that is, they begin to soak up electricity at intervals of 120 deg. from one another, one at 0 deg., another at 120 deg., and a third at 240 deg., and then the first at 360 deg., which otherwise expressed is 0 deg., for it has traversed the whole circle, completing the cycle. The motor is then ready for another cycle. Thus, one conductor is at 0 deg. and without voltage, when two conductors are at half peak, one with voltage increasing and the other with voltage decreasing.

2. Manufacturers have in stock a standard line of 9-to-1-ratio transformers. On a 2,300-volt primary circuit, the secondary current will be at 256 volts. With the secondaries connected Y, this gives a 3-phase voltage between phases of 443, which just fits the 440-volt motor. The Y-point would be grounded and connected to the ground wire of the cable.

3. Should the same size of cable be used as for 220 volts, the watt loss in the cable would be only one-third that in 220-volt service. On the other hand, smaller conductors can be used, which will make the cable easier to handle and, as there will be fewer layers on the reel, the cable in operation will keep cool. Heat of overloads rather than high voltage causes cable failures and cable damage. Most portable secondary cables are built for 600 volts. The whole secondary system could be of smaller wire or, if maintained as now, have only one-fourth the voltage loss.

4. As the bottleneck for power usually is in the secondary system, machines would operate with more "pep," stalling would be much less frequent, motors would heat less, and maintenance cost would be lower. Most motor troubles, as well as cable failures, are due to overheat rather than overvoltage.

5. On the crucial point of safety to men:

(a) With 2,300-primary voltage, the secondary 256 volts to ground is less than 12 per cent in excess of the present 230 volts and still well within the permissible 275.

(b) Our voltage has still 13 per cent to go to reach that of our English cousins.

(c) As stated above, failures are caused more by overheated equipment than by overvoltage, and accidents are a result of such failures. (Examine your own equipment and accident records and check that point.)

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## Why Roof Fails in Narrow Work Miles Away From Surface

Much stress has been laid on the deterioration and destruction of the roof near the mine opening, but deterioration and collapse occur also in that much larger portion of the workings where the condition of the mine air almost never changes and is not affected by night or day, summer or winter, rain or drought. In such locations are found no dews, no drying winds, no cold, no heat, nor variations of them, but the roof falls nevertheless despite the narrowness of headings, crosscuts and rooms.

In the heart of the mine, the only change is in the lowering level of the ground water, which in its descent saturates measures that for eons have not been subject to moisture. Since the sediments first laid a cover over the peat bog, methane under high pressure, by filling the interstices of the rock, has kept the water at a distance above the bed, but as soon as headings are driven in the coal, the gases in the rock have a place to go and the water can drive the methane out of roof and coal into the mine, and can take the place occupied by that gas. Finally it can itself drain into the mine, leaving channels in the roof open for the entry of air.

Oxidation follows, but this action may not be as destructive to the roof as the earlier moistening of colloid clay bands which has resulted directly from the descent of the water. Moisture swells these bands and they force down the roof. Thus, the clay is not merely a source of structural weakness by reason of its inability to resist tension or compression and its viability or plasticity, which enables it to travel into crevices or into spaces created by inequalities of flexure, but also because it develops a bursting characteristic that can wreck more resistant rock members.

The changes in the location of water level and the swelling of roof clays, roof shales, roof limestones and roof coals may occur nowhere near the lower surface of the roof but several feet above the "ceiling" of the mine, and that is why the mass brought down is often of monolithic proportions.

# QUESTIONS ASKED BY STATE BOARDS

## Queries Asked First and Second Class Foremen At Examination Held in State of Ohio*

### Explosion Without Methane

*Q.*—Could an explosion occur in a mine that is free of methane? Explain fully.

*A.*—Yes, if the mine contains much fine dust, the dust will explode regardless of the absence of methane. The U. S. Bureau of Mines has repeatedly reported violent explosions without the help of that gas or any other gases except air. An exploding keg of powder, a blow-out shot or an electric arc can ignite dust and explode it without the aid of methane. Many explosions occur in mines labeled "non-gassy."

### Mine Track Costs

*Q.*—What would be the cost of material to lay a mile of track using 25-lb. rails, ties spaced at 2-ft. centers, rails 30 ft. long, four spikes to each tie, rails costing $35 per ton of 2,000 lb., ties 24c. each, spikes 1½c. each, fishplates and bolts 35c. per pair.

*A.*—A mile is 5,280 ft., hence, in a line of rail there will be 5,280 ÷ 30 or 176 rails, but, as there are two lines of rails, there are 352 rails in all with an equal number of pairs of fishplates. A 25-lb. rail will weigh 25 lb. per yard or, if 30 ft. long, 250 lb., so, as there are 352 rails, there will be a total weight of 88,000 lb. = 44 tons. In 5,280 ft. there will be 2,640 ties, as they are spaced at 2-ft. centers, and four times as many spikes, or 10,560 in all.

COST OF MATERIAL IN A MILE OF 25-LB. TRACK

| | |
|---|---|
| 44 tons of rail @ $35 per ton | $1,540.00 |
| 2,640 ties @ 24c. each | 633.60 |
| 10,560 spikes @ 1½c. each | 158.40 |
| 352 pairs of fish plates with bolts @ 35c. per pair | 123.20 |
| | $2,455.20 |

### Oxygen Needed

*Q.*—(a) What percentage of oxygen is necessary to support the flame of a standard safety lamp? (b) Of a miner's carbide lamp?

*A.*—The air in the mine never consists solely of surface air deprived of oxygen. There is always some carbon dioxide present, which gas is a little more extinctive than nitrogen.

(a) A bonneted Wolf lamp will be extinguished when its combustion has created an atmosphere containing 16.50 per cent of oxygen, 3.00 per cent of carbon dioxide, and 80.50 per cent of nitrogen.

(b) An acetylene lamp will be extinguished when its combustion has created an atmosphere containing only 11.70 per cent of oxygen, 6.30 per cent of carbon dioxide, and 80.50 per cent of nitrogen.

* Continued from p. 64, *Coal Age*, November, 1940.

## Examination of Applicants for Certificates Of Competency as Mine Boss, Indiana*

### Safety From Roof and Coal Falls

*Q.*—If you were in charge of a mine, what orders would you give and enforce for the protection of your employees from falls of roof and coal?

*A.*—I would discuss the problem of roof protection with the assistant foreman and such other employees as I thought understood the needs of the roof and also with the mine inspector, and I would then prepare a systematic timbering plan that every miner must follow as a minimum, with the understanding that any weak portions of the roof needing more support should be given further protection, as occasion may require.

I would call a meeting and discuss the plan with the men, modify it if necessary and then get the inspector's final approval, and discipline those who fail to comply with it. If the roof is shelly, I would put large caps or crossbars over the posts. If the bottom is too soft, I would put "cap-pieces" also on the floor. I would have safety posts erected in the face of every room; more than one where the roof is bad.

I would require that, on entering the place, every boss cutter, boss driller, boss timberman and boss loader test the roof at the face from rib to rib to ascertain if it is safe. These men should not only strike the roof with a hard heavy stick or rod but feel with the hand for a vibration testifying to its unsoundness and also should listen for drummy sounds.

They also should examine the roof under a good light and post it if necessary, doing so without delay, disregarding the fact that the systematic timbering plan may not require a timber to be placed at that point. They should be particularly on the outlook for kettlebottoms (fossil tree stumps or masses of fossilized vegetation in the roof), and if long crevices are found they should be posted carefully.

I would see that every man had enough timber, of suitable length, with properly cut cap pieces and cross timbers in accord with Mining Laws of Indiana, Sec. 45. If these are lacking, the men working in these places must wait until the timber arrives and keep away meanwhile from the inadequately supported roof. I would see that a sufficiently large blackboard was provided near the main entrance of the mine whereon would be stated, in figures, the length of all timbers in use in the mine, so that the miners, when needing timber for securing working places, could register thereon their respective numbers under the figures indicating the length of timber they need; though I might choose lawfully some other equally efficient way of arranging for such notification (Sec. 45).

Should the roof be irregular, I would require that the men be equipped with a crosscut saw. Wherever possible, I would have timber erected by a timber crew. The roof in roadways should be examined every day as scrupulously as the room face. Roadways in rooms should be tested daily. Very bad roof should be scaled carefully, then closely timbered, gunited or painted. Air-conditioning is desirable to prevent falls on intake airways within a few thousand feet of the intake.

Accidents from falls of coal usually occur when the pillar or face is not broken off vertically. If the top of the coal bed is allowed to project several inches beyond the bottom at the face or side, it is likely to fall suddenly due to roof pressure, especially seeing that it is unsupported on one side and often has a definite butt or face cleavage on the other. These overhangs are termed "brows," and they are likely to fall without warning. This dangerous condition, in case of face falls, arises when drillholes at the face are not drilled to the full depth of the undercut or, in the case of rib falls, are located too far from the rib. These brows should be broken loose by blows of a pick.

When places are driven off long-standing headings, or headings are widened, unusual care should be taken, as the side of the rib may be cracked loose from the pillar and the roof may be greatly weakened for the distance of a machine cut or more. The brow, if there is one, should be posted; the undercut duly spragged and the top of the coal posted.

### Men Trapped Behind Fire

*Q.*—(a) If, on arriving at a mine, you were told it was on fire, with men trapped beyond the blaze, what would you do if asked to take charge of their rescue? (b) What dangers would you expect to encounter?

*A.*—(a) Almost the same question was answered in *Coal Age*, October, 1941, p. 127, and little need be added to that reply. I would ask first if coal company headquarters, the U. S. Bureau of Mines, the State mining

* Continued from p. 89, *Coal Age*, December, 1941.

department, the district inspector and the necessary doctors had been informed of the disaster and, if not, I would see that this was done. I would have someone send word to neighboring rescue stations to obtain breathing apparatus, pulmotors and similar equipment.

If strange to the mine, I would examine the map and find the location of the fire and where and in what direction the air travels and would inquire as to the presence of some exit (even a doghole) other than those rendered inaccessible by the fire, sending, if the use of such exit is feasible, two or more men who know or can find the way to lead out the trapped men. The direction of the air currents would determine the feasibility of that rescue, but, if the men would anywhere have to enter the return, the vigor of the fire would have to be considered also. However, it *may* be possible if breathing apparatus is available for the rescuers, and self-rescuers or gas masks are obtainable for the trapped men, to bring out the latter even regardless of the direction of the air current if the air is not too hot or too greatly befouled. If the mine is not gassy, the fan sometimes can be reversed without danger and with advantage, permitting the men to leave by what originally was the return.

(b) In such a mine, the absence of sufficient oxygen for respiration may be one source of danger. Men will be unable to use self-rescuers or gas masks in such an atmosphere, for these, though exceedingly helpful under many conditions, merely remove noxious gases; they do not supply oxygen, the only gas men can use in respiration. If the proportion of carbon monoxide exceeds 2 per cent, it may make such equipment useless and will create more heat in the apparatus than can be borne by the man using it.

Oxygen breathing apparatus is free of these defects, supplying its own oxygen, and so being entirely self-contained, but even this equipment cannot be used where temperatures are excessively high. It is not well to proceed with self-rescuers or gas masks where oxygen content is low or carbon-monoxide content is high, certainly not to penetrate the recesses of the mine hoping to return to the surface with their aid. The self-rescuer is intended only for one-half hour of service.

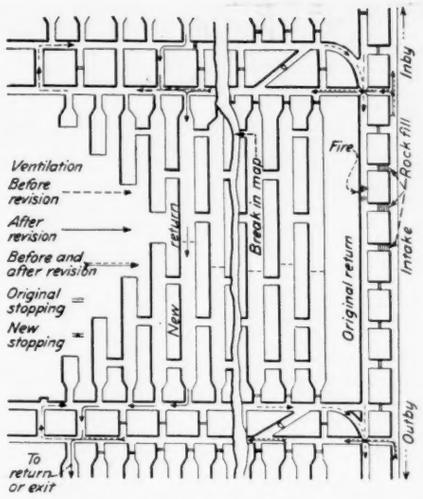


Fig. 1—Revising ventilation to keep methane from fire.

An important danger in a gassy mine is the risk of an explosion should air be drawn to the fire from a gassy region of the mine, especially if the return air from a working heading or headings is drawn near or over the fire. In that case, some means should be taken to find another way of directing the air of this section either to the surface or to a point in the mine beyond the fire, where it could be delivered to the return, at a point far enough from the fire not to come in contact with flame. It may be necessary to recast the greater part of the ventilating system so as to pass the return current around the fire (see Fig. 1), but, if such arrangements cannot be made, such a gassy working should be bratticed off as tightly as possible.

Another danger is that a fall may drive the gases from the fire back on those who are on the leeward, or intake, side of it. A further risk is that someone may reverse the fan. This can be avoided by putting men in charge who will prevent its being done except under orders of the person in control.

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# Questions and Answers, Examination for Anthracite Foremen and Assistants*

### Electrical Misfires

*Q.*—Name some of the causes of misfires with electric blasting.

*A.*— *Defective Conditions — Cartridge* — Damp or otherwise deteriorated cartridges often misfire; exposure to heat affects cartridges adversely; a wet hole also may dampen cartridges; excessive wrapping at end of cartridge may prevent propagation of explosion from cartridge to cartridge; for this reason, some workmen remove the ends of the cartridges before inserting them in the drillhole.

*Detonator*—Misfires may occur from inadequate strength of detonator either because a detonator of the right strength has not been chosen or supplied or because the detonator has deteriorated; dampness may corrode the bridge wires so that they break easily and moisture will do other damage; violence, moreover, may cause the bridge wires to break.

*Leads*—Imperfect insulation or insufficient cross-section in leads may create excessive resistance; such inadequate cross-section may occur when, in cleaning a No. 18 or finer wire, the knife scrapes away some of the copper. With such high resistance, voltage will be reduced, and the detonator will not explode. When more than three blasting caps have to be exploded, use nothing less than No. 14 lead wire.

*Battery or Blasting Machine*—Inadequacy, dampness, wetness or lack of repair may make blasting machine unable to furnish the voltage and current needed for detonation; in rock work, so many shots may be connected in the circuit that the machine or battery cannot overcome the resistance and fire the shots. Blasting machines should be tested at intervals and, to magnetize the field magnets, the machine should be operated two or three times before leading wires are attached. Blasting machines should be taken out of the mine at night or the electrical parts may become damp and ineffective.

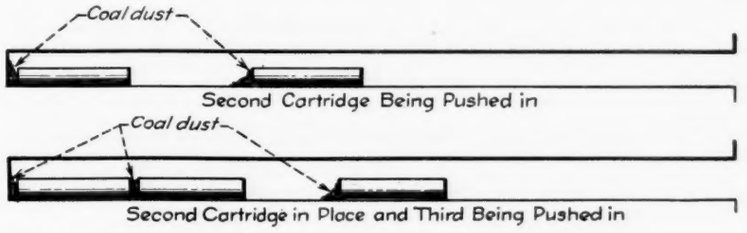
*Errors in Operation—Drillhole*—Imperfect cleaning of drillhole leaves coal dust therein that may be pushed up between the cartridges when they are being inserted, making detonation difficult or impossible; cartridges should not be placed in the drillhole one at a time, lest the front end of the second or third cartridge push or bulldoze the dust against the rear end of the cartridge that precedes it and so will prevent effective detonation and may cause misfires. See illustration.

*Detonator*—Improperly placed in primer or dislodged from primer in tamping, the detonator may fail to fire or may give inadequate detonation; short-circuiting of leg wires when half-hitched around cartridge may result likewise; all detonators should be from same manufacturer, or they may not be exploded by the same intensity of current.

*Wires*—Another cause of misfires is inadequate electrical connection between leg and lead wires; legs have their ends tinned for this purpose; if legs must be shortened remove not only insulation but enamel also. Other causes are the supplementing of lead wires when broken and parts lost by old leg wires which, being covered with enamel by manufacturer to prevent rust, make connections inadequate and resistance unduly high. Two other causes of misfires are: misconnection of leg and lead wires and contact of insufficiently insulated lead wires with rails, pipes, machinery, wet floor or water which will ground the current.

*Blasting Machine*—Failure to plunge the handle of the blasting machine with sufficient force frequently causes a misfire. Resistance increases as the handle descends but the pressure on the handle should be enough to overcome that resistance.

Biggest of all among causes for misfires is lack of training of miners and shotfirers in the art of blasting. How shall they know unless they are told?




Clean hole and don't insert cartridges in it one at a time.

* Continued from p. 90, *Coal Age*, December, 1941.

Only 8 of 17 Points!

# HAZARD LAY-SET Preformed

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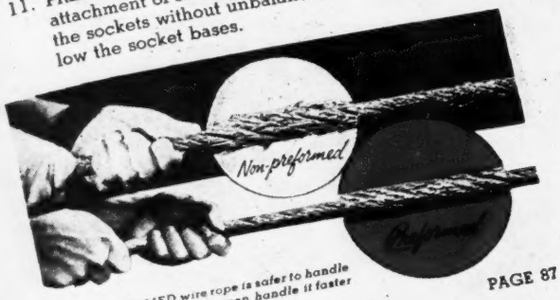
4. The load on a PREFORMED wire rope is distributed equally to each strand, and to each wire in every strand. The rope is safer under load, lasts longer and maintains the safety factor better.
5. When outer wires break they do not stand up from the surface of the rope to injure workmen, sheaves and the rope itself.
6. PREFORMED wire ropes are installed with greater ease and in shorter time.
7. PREFORMED wire ropes are "pre-broken-in."
8. PREFORMED wire ropes, in stretching, do not suffer change in length of lay. Strands are merely bedded firmly to the core.
9. PREFORMED wire ropes do not rotate in the sheaves to the same extent as non-preformed ropes.
10. PREFORMED wire ropes resist the whipping associated with vibration.
11. PREFORMED wire ropes permit more "fool proof" attachment of sockets, helping workmen to attach the sockets without unbalancing the rope lays below the socket bases.




Worn PREFORMED wire rope is safer to handle — does not "porcupine" — men handle it faster

PAGE 87

*This is a page reproduced from the* MODERN WIRE ROPE DIGEST *—America's No. 1 authority on wire rope, its manufacture, construction, care and use. It lists 17 points of superiority for the preformed type of wire rope.*

● Being preformed (and the *first* rope to be preformed under the assigned patents) Hazard LAY-SET has repeatedly proved up on all seventeen points in practically all applications. LAY-SET PREFORMED is backed by 96 years of rope-making experience and by a company that has clung so tenaciously to quality materials, manufacture and service that it has on its books many firms who have used Hazard ropes continuously for 40, 50 and 60 years. All Hazard ropes identified by the Green Strand are made of Improved Plow Steel.

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HAZARD LAY-SET Preformed WIRE ROPE

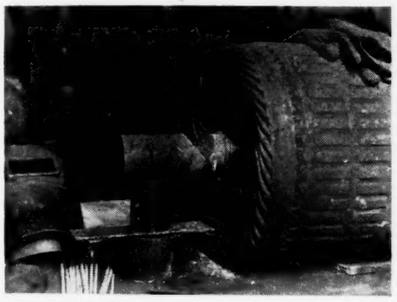
# WHAT'S NEW IN OPERATING IDEAS

## Emergency Armature Shaft Repair Accomplished by Welded Splice

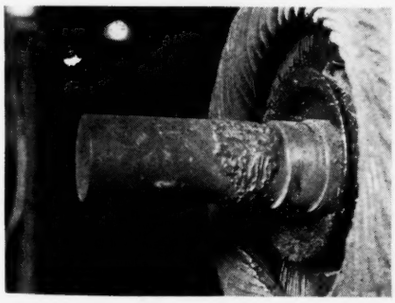
Various stages in the emergency repair of a broken old-type armature for a mine locomotive are shown in the accompanying illustrations, submitted by Ernest Prudent, chief electrician, Zeigler No. 1 mine, Bell & Zoller Coal & Mining Co., Zeigler, Ill. "In order to replace the broken shaft," Mr. Prudent points out, "we would have had to take out all the armature coils. These coils had seen considerable use and to remove them probably would have rendered them worthless. We had no coils in stock and needed the services of the locomotive. The accompanying illustrations explain better than words the method used in repairing this armature shaft.

"We didn't expect this job to hold up very long, but the armature saw two more years of service. When it did fail it was the fault of the winding. The welded shaft was still serviceable but we replaced it with a new one before installing new coils.

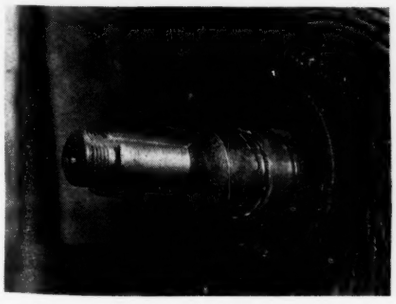
"Since then, a collar has been welded to the cores of our armatures to support the commutators so that shafts may be replaced without disturbing the windings. The cost of welding the armature shaft was about $21; cost of a new set of coils, $78.50. Thus, the saving was $57.50. In addition, we realized four days of service from the locomotive which we would not have had had we waited for new coils."



Broken armature shaft on 13-ton locomotive. New shaft would have required coils.



3-in. mine-car axle welded to armature shaft without damage to coils.



Armature shaft as finished, turned and threaded at a cost of only $21.

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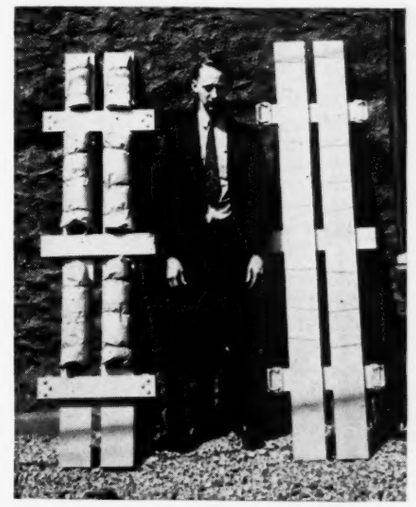
## Stretcher-Splint Developed To Facilitate First Aid

"To replace the army stretcher and the miscellaneous splints and first-aid materials in the first-aid stations," the stretcher-splint shown in the accompanying illustrations has been developed at the Gibson mine, W. J. Rainey, Inc., Bentleyville, Ill., reports W. W. Dartnell, superintendent. "For treating minor cuts and bruises, our mine officials carry pocket first-aid kits," Mr. Dartnell points out.

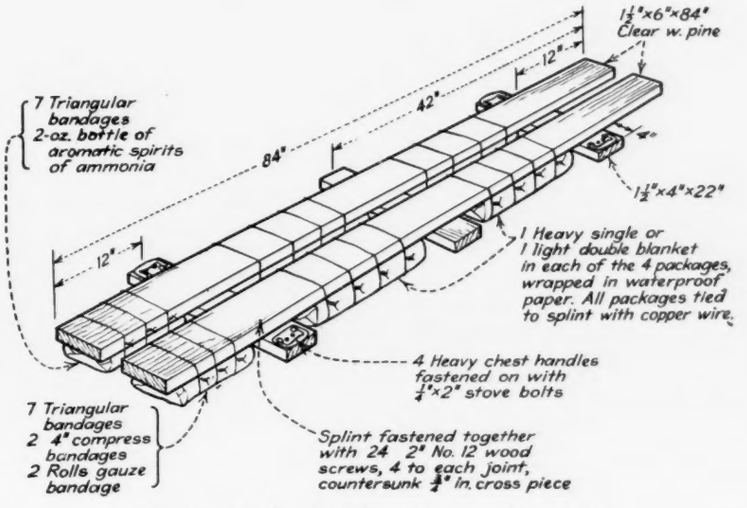
"In studying the problems encountered in treating injured men in the mine, we have found that it is almost impossible to prevent theft of first-aid material and supplies. Even blankets have been stolen from the canisters. Thus, when an emergency arose, there was not the proper material available to treat and care for the patient properly.

"The illustrated stretcher-splint is the result of several experiments and through actual use has proved to be very practical and has solved the major problems that confronted us. We have one of these stretcher-splints in each section of the mine and several outside, so that one can be immediately sent back into the section to replace the one in use.

"The construction is similar to the U. S. Bureau of Mines broken-back splint, except that 1½-in. boards are used in place of 1-in. ones, since we found that the thinner ones bend when carrying an average-weight man. The crosspieces are securely fastened as shown, and the chest handles provide a means of carrying the loaded stretcher-splint.



Showing the splints, complete with first-aid material, ready for service.


1½"×6"×84" Clear w. pine
12"
42"
84"
7 Triangular bandages
2-oz. bottle of aromatic spirits of ammonia
1½"×4"×22"
12"
1 Heavy single or 1 light double blanket in each of the 4 packages, wrapped in waterproof paper. All packages tied to splint with copper wire.
4 Heavy chest handles fastened on with ½"×2" stove bolts
7 Triangular bandages
2 4" compress bandages
2 Rolls gauze bandage
Splint fastened together with 24 2" No. 12 wood screws, 4 to each joint, countersunk ½" in. cross piece

Construction details, Gibson-mine stretcher-splint.

"The six packages contain all the necessary material to care for the injured patient and insure his comfortable transportation to the outside first-aid station, where the doctor treats him. The four larger packages contain four to six blankets, which are used to pad the splint and cover the patient. The two smaller ones contain 14 triangular bandages, aromatic spirits of ammonia, compresses and bandages. Waterproof paper is used to wrap and protect the material from moisture, and also can be used over the outside of the blankets to help keep the patient warm. Copper wire should be used to tie the packages, as it can be cut with a knife.

"Orders at the mine are that, regardless of the injury, the injured man must be placed on the splint and treated as a serious case, for our experience has been that the cases that were treated lightly often resulted in the worst ones through mishandling of the patient or his desire to walk or move around. All types of cases are treated in the same general way as prescribed in the Bureau of Mines first-aid manual for fracture of the pelvis. We go on the theory that no layman is capable of diagnosing a case and it is best to treat for the worst and hope for the best.

"One of the chief advantages of the stretcher-splint is that the man is immobile and also comfortable and is not moved from one stretcher to another, as is necessary with the army stretcher and loose splints. The doctor examines the patient on the stretcher-splint and if he decides that it is a hospital case, the man is left on the stretcher-splint, placed in the ambulance and taken to the hospital, thereby minimizing the danger from movement of broken bones to nerves and blood vessels. We also have found that the severe wounds do not bleed as much, as the flesh is not flexed and the blood clots more easily.

"We have tried to simplify first-aid treatment in keeping the patient warm and immobile and getting him to the doctor as quickly as possible. Artificial respiration and blood control also may be necessary in some cases, but the former is more often the case."

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## Acetylene Generators Work Better When Carefully Cleaned

Greatest convenience and economy in the operation of acetylene generators always are achieved through following the simple maintenance suggestions offered by the manufacturer, declares a recent issue of *Oxy-Acetylene Tips*. "A great deal of stress is laid—and rightly—on the importance of thoroughly flushing the water chamber each time a generator is recharged," the publication continues. "This is unquestionably the most important operation performed on a generator. Efficient generator performance cannot be expected if this operation is incompletely done or overlooked. It is not, however, the only cleaning operation required. . . .

"*Filters*—Whenever a charge of carbide is run through a generator, residue (principally slaked lime) is formed. Every pound of carbide forms more than a pound of residue. Most of the residue settles to the bottom of the water shell and is flushed out by recharging. During operation of the generator, however, there always is some residue carried along with the acetylene. Unless this residue is separated from the acetylene before it enters the hose or service pipe, some of it may be carried all the way to the blowpipe to clog up the mixer, injector, welding tip or cutting nozzle. Therefore, every generator is provided with a filter through which the acetylene passes as it leaves the generating chamber.

"This filter, usually a thick pad of cattle hair, has just one purpose: to keep the residue from going any farther. The filter must be replaced after about one month (100 hours) of average operation or it will lose its effectiveness, since, if not renewed, it will become so saturated with residue that the flow of acetylene will be reduced materially and delivery pressure will drop. Filter pads are not expensive. Every user should keep spare pads on hand at all times.

"Filter pads for virtually all acetylene generators purposely are made larger than the recess in which they are to be placed. This oversize is meant to eliminate any possibility of a gap between the edge of the pad and the filter case through which acetylene might bypass the pad. *Never attempt to trim a pad to make an easy fit.* Instead, force the edge of the pad into the recess first, allowing the center of the pad to bulge. When inserting the spacer or clamp, use sufficient force to press down the center bulge so that the felt will be forced into every part of the recess, leaving no crevice between the wall and the pad.

"*Hydraulic Back-Pressure Valves*—Any residue which might pass through the filter meets another obstacle before it can reach the acetylene hose and pass onward into the blowpipe. This is the hydraulic back-pressure valve, the primary purpose of which, of course, is to make certain that no flashback can ever reach the generating chamber. The acetylene must bubble up through the water in the hydraulic back-pressure valve, and therefore at least a part of any residue that escapes the filter will be washed out here. To prevent an excessive accumulation of residue, it is important that the hydraulic back-pressure valve be drained and flushed about every three months. . . .

"*Feed Valves*—Another point to watch for an accumulation of residue is the carbide feed valve. Most generators are fitted with some type of baffle or shield to prevent water splashing on the parts of the feed valve, but even under the best of conditions some moisture, possibly even only from condensation, may collect there. Moisture on the valve will react with the carbide passing through and leave a deposit of residue. If this thin layer is not removed regularly with a soft stick or cloth, or by some other approved method (never use a metal object), it may cause the valve to stick and interfere with the proper feeding of carbide. On some portable generators . . . the feed valve can be inspected without any extra operations every time the generator is recharged. On most larger portable and stationary generators, special built-in valve-cleaning devices are provided, and they should be used regularly and in accordance with the manufacturer's instructions.

"*Gaskets*—Another important rule of generator maintenance is to make regular tests of all joints sealed by gaskets or diaphragms. This should be done by applying soapy water while the generator is under normal operating pressure. Leaky gaskets not only permit a loss of acetylene, but also create a potential hazard. Every penney spent on new gaskets to replace worn-out units will, in the long run, save ten or twenty pennies' worth of actylene."

## Relay Station

**"Tested and approved" is the phrase generally employed in putting the seal of merit on a machine, a product or an idea which has been found successful. Coal mines are the proving ground for numerous ideas developed by operating, electrical, mechanical and safety men in the daily discharge of their duties. And the Coal Age Operating Ideas department is the relay station for passing them on to others who may find themselves with similar problems to solve. So if you have developed a slick answer to a puzzler, send it in, along with a sketch or photo if it will help to make it clearer. For each acceptable idea, Coal Age will pay $5 or more on publication.**

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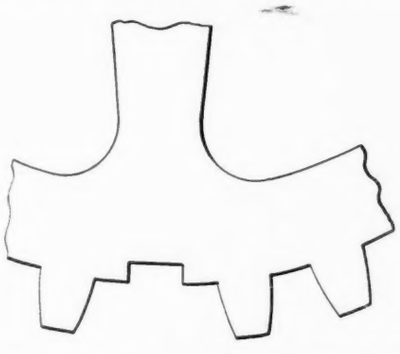
## Use of Studs Eliminated In Replacing Gear Teeth

In replacing teeth in small gears, the time and expense of drilling and putting in studs to assure a permanent job may be avoided by cutting a fairly deep groove in the rim with a thin cutting wheel, says Earl Pierce, Bath, N. Y., in a recent issue of the Lincoln *Stabilizer*. "When using a good cast-iron rod, such as 'Ferroweld,' we fill the groove level with the surface and build the tooth onto it. It gives as strong a job as studding with only half the work."



Showing how gear is slotted with thin grinding wheel.

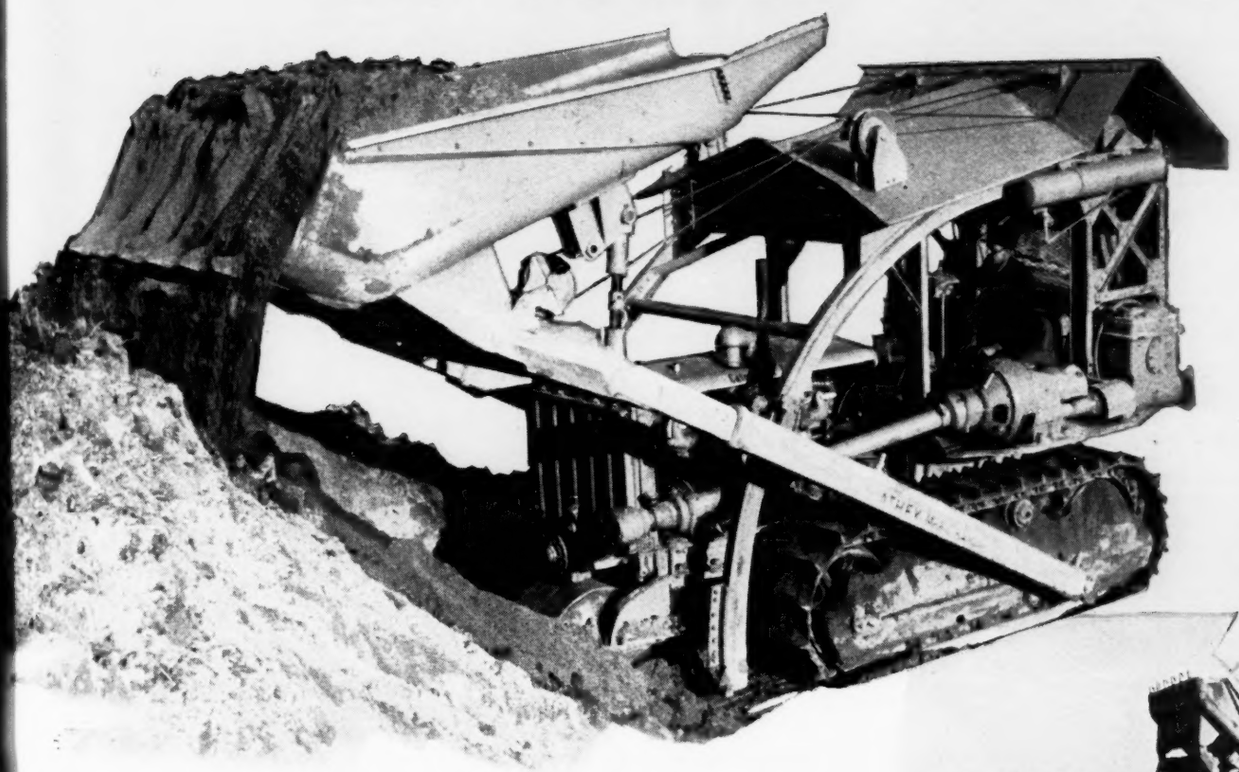
•

## Two Pieces Clamped by Bolt Feature Car Stop

Two-way use and positive locking in vertical position on the ball of the rail are features of a steel car stop which brought a $2.50 prize to Adam Fulford, American Coal Co. of Allegany County, McComas, W. Va., in the "Gadget Contest" at the Southern Appalachian Industrial Exhibition, held at Bluefield, W. Va., in August. The stop is made in two halves similar except that one has a plain hole for the clamping bolt and the other a threaded hole or

# *Now* . . . A Big-Capacity Athey MobiLoader to Match

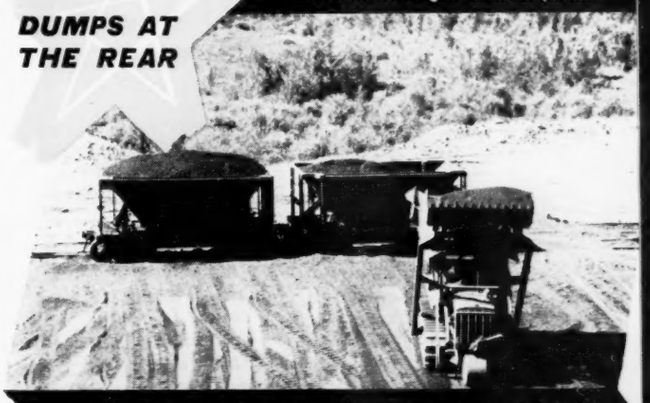
# BIG SHOVEL PRODUCTION



***DIGS AT THE FRONT***

Above photos show borrow pit excavation for material to build roads to Michigan bomber plant.

***DUMPS AT THE REAR***



MobiLoader on Mesabi Iron Range saves time and money loading iron ore concentrate into railway cars.

## Substantial Savings in Initial Investment and Operating Costs

To extend the speed and economy of the MobiLoader to a wider range of uses, Athey offers the Model 8 MobiLoader . . . a companion to the job-proved Model W4.

Now, with greatly increased capacities and using the heavy-duty "Caterpillar" D8 Tractor for power, the MobiLoader enters a new field — makes available a mobile, cost-cutting loading tool that provides big output in less time at low cost.

The Athey MobiLoader uses the simple and time-saving method of digging at the front and dumping its load overhead at the rear, thus eliminating turning the tractor around for discharging the load. In that way, the MobiLoader does the job faster and cheaper, reduces operating expense and tractor wear, enables you to step up your production to more profitable levels.

Proved on actual operations for more than two years, the Model 8 MobiLoader has introduced shortcuts in the handling of ore, coal, earth, clay, gravel, crushed stone and all stockpiled materials — has displaced costly and antiquated methods and equipment.

Now's the time to assure utmost efficiency on your defense jobs. Get more facts on this big-capacity, mobile loader. Mail the coupon today for an interesting folder — sent without obligation.

Bucket sizes for Model 8 MobiLoader range from 2.7 to 4½ cubic yards, depending upon type of material. Model W4 MobiLoader capacity is 1⅛ cubic yards for general excavation and 3 cubic yards for snow removal.

*The Athey line includes Earth and Rock Trailers, Oil Field Trailers and Wagons, Logging Cruiser Wheels, MobiLoaders, Force-Feed Loaders and Trailer equipment for every hauling need.*

# ATHEY

**MAIL COUPON TODAY**

Athey Truss Wheel Co.
5631 W. 65th Street
Chicago, Illinois

Gentlemen:

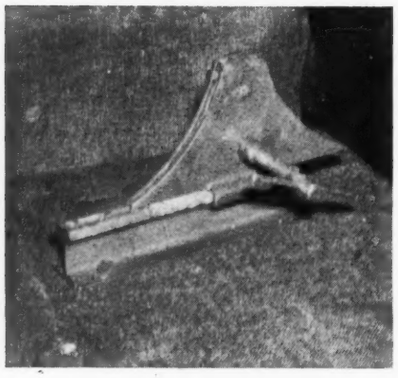
Please send me, at no obligation, descriptive folder on the Model 8 MobiLoader.

I am interested in loading_____

Signed_____

Address_____

City_____



Two-piece McComas car stop.

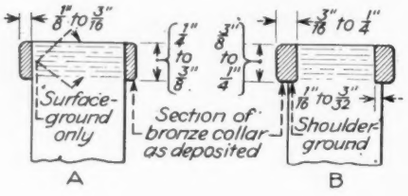
welded-on nut. Putting a T-handle on the clamping bolt makes it possible to tighten the device by hand sufficiently for normal use.

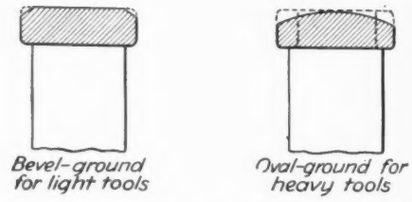
•

## Hammer-Struck Tools Safe-Ended By Welding on Bronze Collars

Pointing out that the procedure is simple, quick and economical and can be used for all types of chisels and struck tools, a recent issue of *Oxy-Acetylene Tips* gives a complete description of the process, including hints on how to construct a jig for holding various types of tools. Working drawings for the jig, it is stated, may be obtained from any Linde district office.

Safe-ending may be applied to new tools as well as old, "and can be repeated as often as necessary during the life of the tool. In actual use, the struck ends of safe-ended



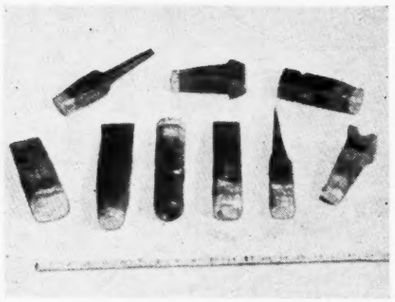




Showing safe-ending methods with lightly struck tools (surface cleaned before welding), as well as heavier tools, on which a shoulder is ground.

chisels have outlived those of untreated new chisels about 3 to 1 without showing an appreciable sign of mushrooming, cracking or spalling.

"Briefly, the procedure consists simply of either cutting the struck end of the tool down to sound metal or rebuilding with suitable weld metal if the tool cannot be shortened, and either filing or grinding the end where the bronze is to be applied. A band of bronze then is deposited on this shoulder and the operation completed by grinding."

The initial grinding is done to provide a



Examples of tools of various types after being safe-ended.

surface completely free of rust, scale or other foreign matter. After this preparation, a layer of No. 25 M. bronze, $\frac{1}{4}$ to $\frac{3}{8}$ in. wide and $\frac{1}{8}$ to $\frac{3}{16}$ in. deep, depending upon the size of the tool, is built up on the area that has been ground. Tests have shown, it is stated, "that there is no appreciable change in hardness caused by the safe-ending operation, regardless of the after-treatment given, whether it be slow cooling or water quenching. It should be pointed out, however, that the safe-ending operation will be successful and will produce no change in hardness only when the proper bronze-welding technique is employed." The surface should be clean and the base-metal temperature should be 1,600 to 1,700 deg. F. The flame should be as small as possible and the welding operation speeded up near the finish to prevent overheating the base metal by long-continued flame application.

•

## Use of Loudspeaker Facilitates Dispatching Communications

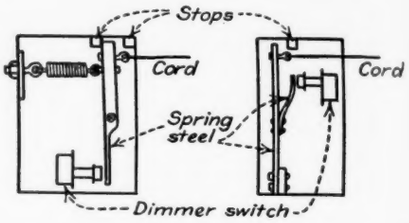
Use of a loudspeaker and amplifier, reports Claud Williams, dispatcher, Harvey Coal Corporation, Harveyton, Ky., as compared with the usual earphone, enables him to hear clearly reports coming into his office at all times, even when a motor and trip are passing.

This loudspeaker helps, Claud Williams finds.

## Dimmer Switch Is Utilized In Pull-Cord Control

For remote control of underground conveyors, including self-loading shakers, the bell-cord system, such as is used on railroad trains, has been adopted at some mines. As an electrical unit for the alternate "On" and "Off" mechanism, the standard and inexpensive dimmer switch for controlling automobile headlights has proved satisfactory if control currents are small.

The problem is to obtain a strong mounting so that a heavy strain on the cord will not damage the spring which effects cord return and will not put undue force on the pushbutton of the dimmer switch itself. Two




Two dimmer switch arrangements.

of the numerous ways by which this "mine" strength can be accomplished are shown in the drawing.

In the arrangement at the left, which uses a pivoted lever, tension of the spring effecting cord return can be adjusted. In this design, the lower end of the lever consists of a leaf spring which limits the pushing force on the dimmer switch. In the arrangement at the right in the illustration, a secondary spring riveted to the main leaf limits force against the dimmer switch. In both designs, with the cord attachment eye set close to the stop block, no harm can result from excessive pull on the cord.

•

## Safe 6-Volt Extension Cords Used on 110-Volt Lines

In all places where alternating current is available for extension-cord lighting, these cords can be made absolutely safe from the standpoint of shock by adopting a practice of the Public Service Electric & Gas Co. of New Jersey. The cords are equipped with 50-watt 110/6-volt transformers and use 6-volt lamps, now stated to be available with standard screw bases.

The presence of steel building frames, track rails flush with shop floors, purposely grounded motors, etc., plus wet conditions encountered in such places as pumping stations and cleaning plants, make the hazard of a shock to ground from an extension cord an ever-present possibility around mines. How it can be avoided is detailed in the following quotation from *Public Utilities Safety*, published by the National Safety Council.

"There seems to be a belief among workmen that 110 volts is not harmful and can produce fatal shock only in cases where a man has a weak heart. This is not true. Tests have been conducted which show that when an electrical circuit is completed through a wet contact any voltage in excess of 12 is dangerous.

"Realizing the hazard that existed when

# "With GULF ENGINEERING SERVICE we've secured a 3-WAY IMPROVEMENT in loading efficiency" —says this Mine Superintendent

Actual photo of a Gulf engineer consulting with Mine Superintendent on loading machine lubrication.

"OUR records show a 3-way improvement in loading efficiency by following Gulf Engineering recommendations," says this Mine Superintendent. "The proper application of the right Gulf lubricants has resulted in a big reduction in delays, lower maintenance expense, and improved loader performance."

If more production is necessary in your mine from equipment that seems to be operating at capacity, here is a practical suggestion: Call in a Gulf engineer at once. Ask him to make a study of your equipment, then give you his recommendations for improved lubrication practice which will increase its efficiency. His knowledge and experience with equipment similar to yours can be profitably applied to your problems. And he may be able to help you secure the extra production you need.

The services of a Gulf engineer—and the Gulf line of more than 400 quality oils and greases—are quickly available to you through 1200 warehouses in 30 states from Maine to New Mexico. Write or 'phone your nearest Gulf office today.

GULF INDUSTRIAL LUBRICATION

**GULF OIL CORPORATION**
**GULF REFINING COMPANY**
GULF BUILDING · PITTSBURGH, PA.

work was being performed in wet or damp locations that provided a perfect ground for the 110-volt circuit should extension lamps become defective, the electric generation department of the Public Service Electric & Gas Co. in 1928 decided to have one of the local manufacturers design and develop a 110/32-volt 50-watt transformer. During that year (1928) all 110-volt extension cords were equipped with the new 32-volt transformers.

"In 1939, however, as a result of further experimentation, this transformer was rebuilt so that its secondary voltage was reduced to 6 volts, which is recognized as an absolutely safe minimum. It is now possible to procure 6-volt lamps with the standard base. Low-voltage transformers of this kind are being extensively used about the property to eliminate the electric shock hazard.

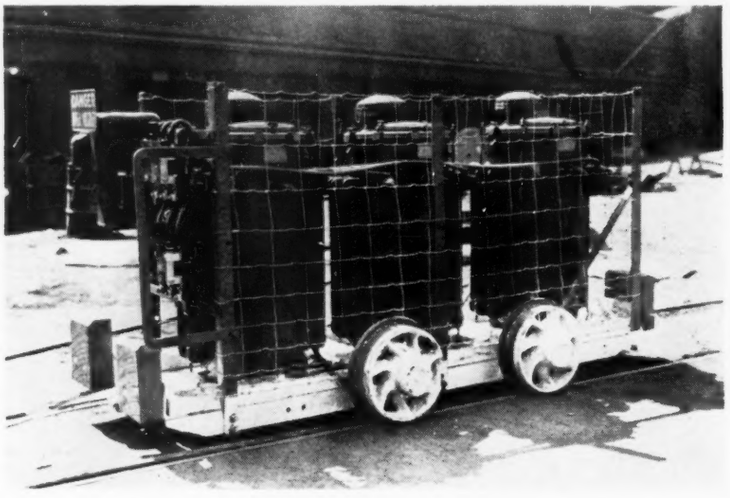
"Cases of electric shock and accidents resulting in falls from shock are recalled which, although in themselves were not serious, indicated the potential hazard that was continuously present. The use of the lower voltage has completely eliminated the hazard, inasmuch as there has not been a single case of electric shock reported since the transformers have been in use."

•

## Making Transformers Portable Aided by New Coolant

By using transformers filled with a non-inflammable coolant, the design of portable substations for underground use has been materially simplified at operations of the Knox Consolidated Coal Corporation, Bicknell, Ind. This company follows the practice of keeping transformers supplying a.c. equipment close to the load, thus keeping voltage at proper levels, minimizing losses and eliminating long secondary feeders.

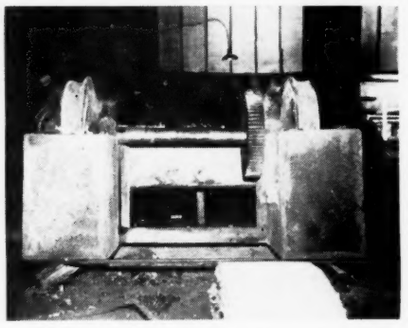
A new portable set, consisting of three General Electric Pyranol-filled transformers (37½ kva., 2,300/4,160Y-120/240 volts), is shown in the accompanying illustration. The transformers are mounted on a steel-bed truck with wooden bumper, and are grounded through the bed and the wheels to the rails. Because the Pyranol is non-inflammable, the former practice of inclosing the transformers in a steel box with lid dropping automatically in case of fire is unnecessary.



New portable substation, with transformers using non-inflammable coolant, ready for duty.

## Furnace Anneals Locomotive Tires Without Removal From Axle

Made by G. W. Moody, master mechanic, and used in the shops of the H. E. Harman Coal Corporation, Harman, Va., the annealing furnace shown in the accompanying illustration permits heating locomotive tires to a cherry red in less than an hour without removing the wheels from the axle. After cooling, the truck is put in a lathe for turning the tires. The furnace is made of sheet iron lined with firebrick with a 3-in. pipe through the bottom for draft, furnished by a No. 2 Buffalo blower.



Showing a locomotive truck in the annealing furnace.

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## Loading-Machine Clutch Center Removed by Spot Welding

Not over 30 minutes is required to remove the center from a loading-machine clutch by spot-welding methods, reports Ernest Prudent, chief electrician, Zeigler No. 1 mine, Bell & Zoller Coal & Mining Co., Zeigler, Ill. Fig. 1 shows the clutch unit as it came to the shop for rebuilding. The center, *A*, had to be removed before the bevel gear under it could be taken off. The center had been hardened and was not provided with any holes in which a puller could be fastened. As the job had to be done in a hurry, softening the center, drilling and tapping were out of the question. Besides consuming too much time, this procedure would have cost $6.50 for labor.

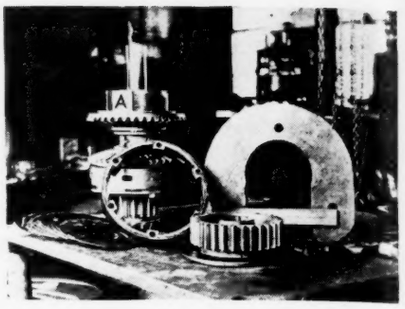



Fig. 1—Clutch as received for rebuilding. A shows the center to be removed.

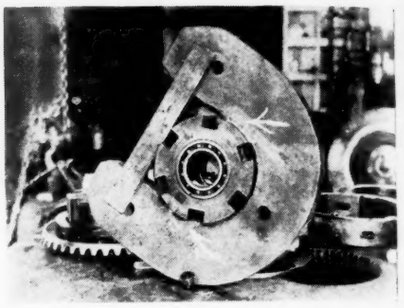


Fig. 2—Showing 1-in. plate welded to center.

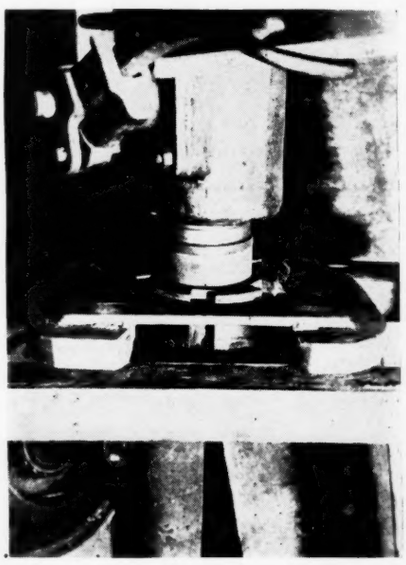


Fig. 3—Clutch unit in press for removing center.

"Fig. 2 shows a 1-in. plate cut and welded to the center. Fig. 3 shows the clutch unit in the press under a 25-ton jack. Many times the entire capacity of the jack was required to remove the center, and it amazed us to discover that the two welds shown in Fig. 2 would withstand such tremendous pressure. After the clutch was removed the welds were cut and the center was dressed up. The hardness at the points of the welds did not assume any importance.

"We have removed clutch centers in this fashion for more than ten years. Not over 30 minutes and two $\frac{5}{16}$-in. welding rods are involved. Contrast this method of removal with any other and, of course, you will use the weld method."

# REDUCE TIME OUT FOR SHOVEL MAINTENANCE

## WITH LUBRICATION ENGINEERING

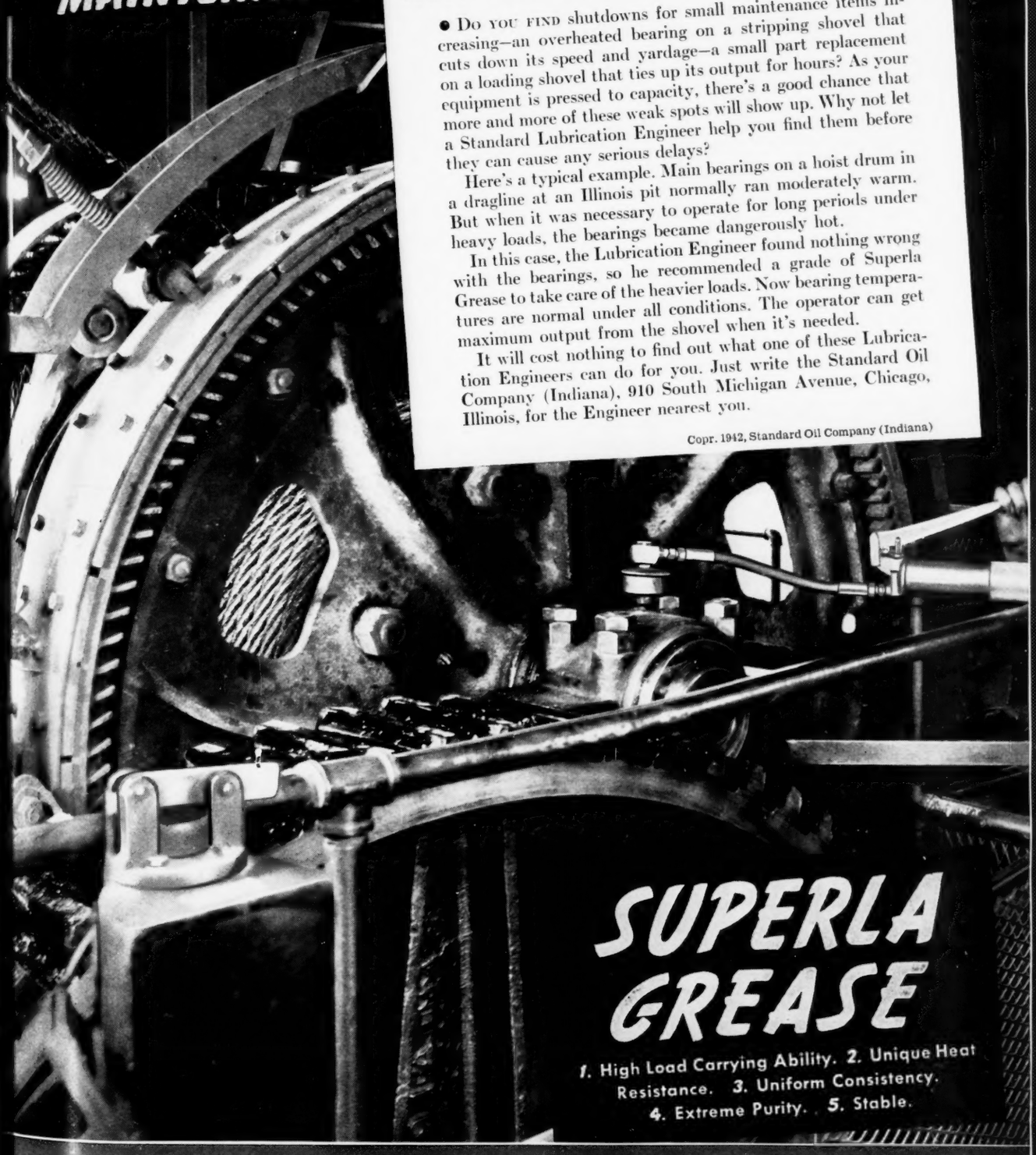
● Do you find shutdowns for small maintenance items increasing—an overheated bearing on a stripping shovel that cuts down its speed and yardage—a small part replacement on a loading shovel that ties up its output for hours? As your equipment is pressed to capacity, there's a good chance that more and more of these weak spots will show up. Why not let a Standard Lubrication Engineer help you find them before they can cause any serious delays?

Here's a typical example. Main bearings on a hoist drum in a dragline at an Illinois pit normally ran moderately warm. But when it was necessary to operate for long periods under heavy loads, the bearings became dangerously hot.

In this case, the Lubrication Engineer found nothing wrong with the bearings, so he recommended a grade of Superla Grease to take care of the heavier loads. Now bearing temperatures are normal under all conditions. The operator can get maximum output from the shovel when it's needed.

It will cost nothing to find out what one of these Lubrication Engineers can do for you. Just write the Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago, Illinois, for the Engineer nearest you.

Copr. 1942, Standard Oil Company (Indiana)



## SUPERLA GREASE

1. High Load Carrying Ability. 2. Unique Heat Resistance. 3. Uniform Consistency. 4. Extreme Purity. 5. Stable.

## TANDARD OIL COMPANY (INDIANA)

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# Our Mutual Task

THERE can be no better time than this beginning of 1942 to thank our customers for their unfailing patience and the consideration they have shown in the past twelve months toward our efforts to supply the myriad emergency demands for steel.

Today you as consumers and we as producers of steel have a mutual task of achieving the maximum output of materials for war. We must also produce materials for the indispensable minimum of goods for our domestic economy.

The coming of active warfare has made our mutual task as the year opens increasingly arduous. Bethlehem is exerting the utmost effort to meet unprecedented demands. It is our purpose to serve our Government to the utmost of our ability in this emergency. More than 800,000 tons of steel capacity has already been added, together with accompanying increase in coke ovens and blast furnaces, and expansion of finishing facilities. Further expansions in ingot capacity, and in rolling mills, forges and shops, are anticipated. We are purchasing a wide variety of materials from more than 10,000 suppliers. Our employment rolls have been stepped up to more than 180,000.

With all of this, the demand for our products continues unabated, and 1942 will continue to require the full cooperation and understanding between steel maker and steel user.

It is a gratifying and typical characteristic of American industry that all the needs of our Government and of our national purpose have been met on all sides during the past year with vigor and cheerfulness.

Now is added a still greater and unremitting determination. We know that there will be the whole-hearted cooperation of all, so that what needs be done, shall be done.

*"Enough, if something from our hands have power,*
*To live, and act, and serve the future hour."*

**BETHLEHEM STEEL COMPANY**

BETHLEHEM STEEL

# WHAT'S NEW IN THE FIELD

## Federal Mine Inspectors Prepare To Study Safety and Health

Fresh from a six-week training course at the Pittsburgh (Pa.) Central Experiment Station of the U. S. Bureau of Mines, a corps of federal coal-mine inspectors will go into the field soon after Jan. 1 to inspect and investigate conditions and practices in the nation's coal mines and to make recommendations for improving health and safety factors in the mines, Dr. R. R. Sayers, Director of the Bureau, informed Secretary of the Interior Harold L. Ickes on Dec. 15.

The Federal Coal Mine Inspection Act, passed by Congress and approved by President Roosevelt on May 7 last, represents an effort to curtail coal-mine accidents, which have resulted each year in the death of from 1,000 to 2,000 miners and injuries to between 50,000 and 60,000 persons. This, said Dr. Sayers, is "a larger percentage of accidents than obtains in any other major industry."

The effectiveness of the Bureau's health and safety work has been limited in the past, it was stated, because the Federal Government lacked authority to enter and inspect mines unless permission was granted by the operators. Under the new law, the federal inspectors are authorized to inspect the coal mines and the Department of the Interior is instructed to give widespread publicity to their findings and recommendations.

Chosen from Civil Service registers, each of the new inspectors has had at least five years' practical experience in the mining of coal and is recognized as having the training or experience of practical mining engineers. During the intensive training course at Pittsburgh in November and December, the first group of new inspectors reviewed mine safety practices under the direction of experienced Bureau of Mines mining engineers as instructors, studied the most modern and approved methods of detecting mine gases, made analyses of air and dust samples, reviewed the safety factors in electrical mining equipment, analyzed mine ventilation systems and examined causes of roof falls and haulage accidents. They also received instruction regarding the writing of their official reports and methods of procedure under governmental regulations.

The course included a five-day mine-rescue-training period in the use of self-contained oxygen breathing apparatus, with the inspectors participating in typical mine-rescue maneuvers.

The second group of coal-mine inspectors will begin their training period at Pittsburgh on Jan. 5, and will follow the other inspectors into the field within a few weeks.

In charge of the coal-mine inspection program will be John J. Forbes, chief of the Coal Mine Inspection Division, working under the supervision of Dan Harrington, Chief of the Health and Safety Branch of the Bureau of Mines. Mr. Forbes has had more than 25 years' experience in coal-mine safety work.

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## Anthracite Survey Impends

The House of Representatives at Washington has passed the Boland resolution (H.J. Res. 255) creating an Anthracite Economic Investigating Commission. The commission would be authorized to determine the facts relating to, and ways for improving, economic conditions in the Pennsylvania anthracite regions. The commission also is to consider the availability in such regions for defense activities, of skilled and unskilled workers, factories, housing and other facilities, and possible new and extended uses for anthracite and its byproducts. President Roosevelt affixed his signature to the bill on Dec. 20.

The commission is to be composed of two members from the Senate, two from the House, and one each from the U. S. Bureau of Mines, the National Resources Planning Board and the Interstate Commerce Commission. They are to work without pay and make their report to the President.

A similar resolution was introduced in the Senate by Senator Guffey late in the second week of December.

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## Railroads File Plea With I.C.C. For Higher Rates

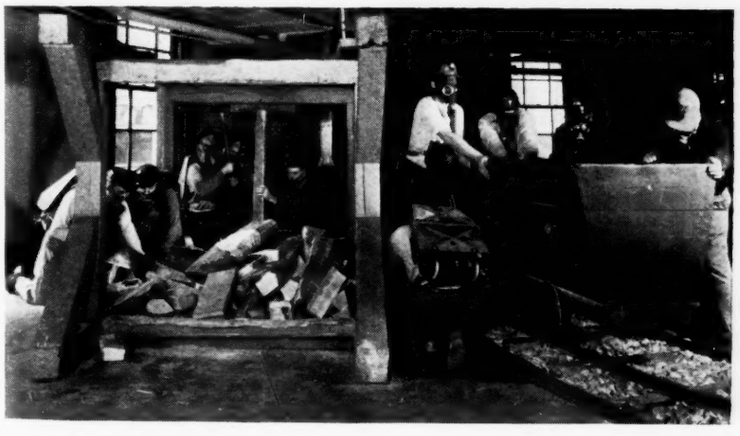
Basing their request principally on the necessity of compensating for the higher wages granted to rail employees on Dec. 1 to prevent a threatened nation-wide strike, 353 United States railroads asked permission of the Interstate Commerce Commission on Dec. 13 to make an increase in rates. The boosts sought are 10 percent in passenger rates except for soldiers on leave and 10 percent in freight rates except on coal, coke and iron ore, for which lesser increases are proposed.

Rising prices of raw materials and a $30,000,000 annual increase in operating costs imposed by precautionary measures against sabotage also were stressed, as well as special services the carriers are being called upon to perform gratis in connection with the movement of troops and defense materials.

The new rates proposed for coal and coke are: Bituminous—Eastern territory, an increase of 5c. per net ton or 6c. gross ton; Southern territory, increase of 5c. a net ton or 6c. a gross ton; Western territory, increases of 3c. a net ton on rates 75c. a ton and lower, 5c. a net ton on rates from 76c. to $1, and 10c. on rates over $1.

These increases would be applied to rates from the southern Illinois group and related origin districts in Illinois, Indiana, and western Kentucky; coal-producing districts in Ohio, Pennsylvania, West Virginia, Maryland, eastern Kentucky, Tennessee and Virginia to destinations in Western territory west of Chicago and Milwaukee. As an exception, all rates to Chicago and Milwaukee would be increased 5c.

For anthracite an increase of 5c. a net ton or 6c. a gross ton is asked for all territories. The rates for coke would be the same as for bituminous coal except that in Western territory not only would all rates to Chicago and Milwaukee have a flat 5c. increase but rates



Wearing self-contained oxygen breathing apparatus, members of the first group of new federal coal-mine inspectors are shown undergoing a five-day refresher course in mine-rescue training at the Pittsburgh (Pa.) Central Experiment Station of the Bureau of Mines, preparatory to beginning their field duties. In the "smoke room" laboratory the new inspectors are sawing wood, placing timbers, pushing a mine car and performing other duties that might be required of them in an actual mine disaster.

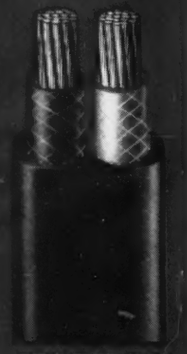
TWO CONDUCTOR CONCENTRIC TYPE

**CONCENTRIC TYPE**

Down where the going is tough, these cables deliver power to coal cutting machines and locomotives. A rope-laid inner conductor and concentric outer conductor make it small in diameter, light in weight. The toughest kind of moisture resistant rubber outer sheath gives it the stamina to survive the hard knocks of mining service.

Concentric Type—600 Volts Maximum

| Size, A.W.G. | Capacity Amps. | Overall Diam., In. | Approximate Net Weight Per 1000 Feet, Lbs. |
|---|---|---|---|
| 1 | 100 | 1.06 | 930 |
| 2 | 90 | .94 | 730 |
| 3 | 75 | .88 | 610 |
| 4 | 65 | .84 | 530 |
| 6 | 50 | .77 | 410 |



TWIN FLAT TYPE

**TWIN FLAT TYPE**

When larger diameter can be used—as on drills, pit car loaders and other portable machines—these cables have all the wear and moisture resistance of the concentric type *plus* greater flexibility, and resistance to impact stresses.

Twin Flat Type—600 Volts Maximum

| Size, A.W.G. | Capacity Amps. | Outside Dimensions, Inches | Approximate Net Weight Per 1000 Feet, Lbs. |
|---|---|---|---|
| 1 | 110 | .88 x 1.44 | 1050 |
| 2 | 95 | .77 x 1.27 | 801 |
| 3 | 80 | .74 x 1.20 | 701 |
| 4 | 70 | .71 x 1.13 | 597 |
| 6 | 50 | .62 x .98 | 445 |
| 8 | 40 | .57 x .88 | 350 |

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from Utah to Pacific Coast points would have a 10 percent increase.

The petitioners, which include practically all the Class I roads, estimated that the proposed increases would produce about $356,956,000 more a year in revenue. This, they argued, would at the most cover their increased charges due to higher wages recommended by President Roosevelt's Fact Finding Board and to war conditions. It would not take care of the accrued increases in pay deriving from the fact that the wage increase was made retroactive to Sept. 1, 1941. The carriers declared that their present rates would not permit them "to continue in the public interest the adequate and efficient service" contemplated by Congress when it took over regulation of them.

•

## West Kentucky Co. Miners Vote Against U.M.W.

Miners of the West Kentucky Coal Co., with mines in the vicinity of Sturgis, Wheatcroft and Earlington, Ky., voting in a second National Labor Relations Board election, again rejected the United Mine Workers as labor bargaining agent. A total of 780 workers voted for the company union to continue handling labor matters as between workers and the company, while 622 voted favoring the U.M.W.

Last June, in a similar election, the company showed a majority of only 78 votes. Soon afterward the U.M.W. filed a bill alleging five points involving an unfair election. The N.L.R.B. upheld four of the charges and ordered a second election held, under its supervision.

•

## Improvements Under Way at Mines In Eastern Kentucky

Improvements at mines in eastern Kentucky are highlighted by construction, which is getting well under way, on the big new million-dollar tipple of the Consolidation Coal Co. at its No. 7 mine, Jenkins. Over this tipple will be dumped coal from the Long Fork section of Pike County, necessitating a haul of 20 miles or more. All the mines of Consolidation are being mechanized as rapidly as possible.

At Wheelwright, the Inland Steel Co. is spending several hundred thousand dollars on a Y.M.C.A. building with swimming pool, etc., besides various mine improvements. In the Blackey section, the Elk Creek Coal Co., Letcher Mining Co. and Carbon Glow Coal Co. have resumed operations.

•

## New TVA Steam Plant to Run Soon

The first generating unit of the Tennessee Valley Authority's new steam plant at Watts Bar Dam will start turning out electric power about Feb. 15. Expenditure for three 60,000-kva. generating units for this plant has been authorized and funds for a fourth 60,000-kva. unit are provided for in a bill now pending.

Watts Bar Dam is situated about midway between Knoxville and Chattanooga. It is reported that at least one coal-mining company is opening a new mine on the strength of this new potential demand.

### Smoker's Match Is Blamed For Boone Explosion

E. J. Hunt, of the U. S. Bureau of Mines, issued a statement Dec. 15 holding that the explosion which caused 15 men to lose their lives at the Daniel Boone mine of the Stirling Coal Co., Daniel Boone, Hopkins County, Kentucky, on Oct. 27, was caused by a miner trying to light a pipe or cigarette and touching off gas which had accumulated in one of the working places.

The Bureau said the mine ventilating fans had been shut off Sunday, Oct. 26, and were not operated until 6 a.m., Monday, about an hour before the men went to work. The explosion occurred about 7:15 a.m. The statement said no tests were made in working places for methane before the men went to work.

•

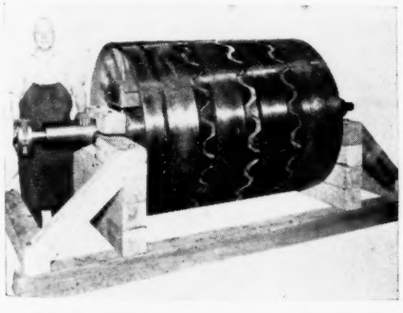
### Asks Bill of Particulars In Wage-Hour Case

Panther Creek Mines, Inc., Springfield, Ill., filed a motion on Dec. 8 for a more definite statement of course of action and for a bill of particulars in connection with the suit filed Nov. 6 in Federal Court in Illinois against the coal company by the Wage and Hour Division, U. S. Department of Labor. The Division sought an injunction to restrain the company from allegedly violating the Fair Labor Standards Act (*Coal Age*, December, 1941, p. 108).

•

### Leases West Shenandoah Mine

West Shenandoah colliery, former Philadelphia & Reading operation, Shenandoah, Pa., has been leased by the Kohinoor Coal Co., which has completed construction of a new preparation plant costing $200,000. The banks on this property will be reclaimed and prepared through the new breaker, using Chance cones on prepared sizes and Wilmot Hydrotators on steam sizes, including No. 4 buckwheat.



### Considerable Drawing Power

Said to be the largest commercial magnet ever built, the dimensions of this high-intensity magnetic pulley are 48 in. diameter x 63 in. face width. The unit, manufactured by the Dings Magnetic Separator Co., Milwaukee, Wis., is to be installed by a large producer of electric power. It will be applied as a magnetic head pulley of a coal conveyor belt for automatic extraction of tramp iron, to protect crushers and pulverizers from damage from that source. It is of serrated, air-cooled design, incorporating radial and longitudinal ducts to provide for maximum air circulation through the coil area. The separator has a total weight of 18,000 lb.; 5,900 lb. of copper magnet wire was used in winding the coils.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# Shuttle Cars, Dispersants, Roof Decay, Quizzes Arouse Interest of Pittsburgh Meeting

ABROAD, all-embracing program marked as usual the meeting of the Coal Mining Institute of America at Pittsburgh, Dec. 11 and 12. It included: What makes roof decay for a half mile or so in from an intaking mine opening, what the U. S. Bureau of Mines proposes to do under the new mine inspection act, how Doctors IQ can stir up interest in the operations of the drowsy old mining law, how to take the hazard from the shuttle car, why you can't safely drill and load a lot of shotholes at one time in the mines before the coal is undercut, how to use dispersants, or wetting agents, to lay dusts; when to classify a mine as gassy and what are the U. S. Bureau of Mines, the State and the coal mines doing to promote national defense.

*Moisture Causes Roof Decay*—Before the audience, two blocks, one of coal and one of roof slate, both 5 in. long, were immersed in cold water by H. P. Greenwald, supervising engineer, Experimental Coal Mine, U. S. Bureau of Mines. Ames dials were provided to measure the change in length resulting from the immersion of these blocks. In 30 minutes, the coal was shortened by the lowering of its temperature, but the roof shale, despite the temperature reduction, gained about 6 percent in length from water saturation, and began to disintegrate. On behalf of Irving Hartmann, physicist, U. S. Bureau of Mines, and himself, Mr. Greenwald described tests of rock and coal taken from the Experimental Mine. Record of these tests can be found in *Coal Age*, December, 1941, p. 102, and in R. I. 3588. In comment, Mr. Greenwald said that presence of clay bands in coal might cause it to expand untypically with increments of moisture, but that the coal substance itself had little disposition to swell.

### Use of Paint Coatings

*What Paints to Avoid*—Water-emulsion paints might by their water content cause the rock to expand and break down. Asphalts "cut back" by benzines might be dangerous at time of application. As to that he could not say yet. Certainly their presence after the benzine has evaporated is less hazardous than the presence of the coal itself, as the benzine contains only a little carbon, and its volatile constituents are soon dispersed. Paints with bentonite are definitely undesirable, as they will draw water and cause expansion.

*Submergence in Water*—Roofs of submerged mines often show wonderful resistance to the action of water, declared Richard Maize, Pennsylvania Secretary of Mines, recalling the unbroken roofs at the Hostetter and Oliver mines after severe flooding. Coal and sandstone roofs, said Mr. Greenwald, have that characteristic, but clay-shale roofs, like the sample they had seen tested, crumble rapidly. Mr. Maize suggested that this was because, in submergence, six faces are presented to water.

Many failures in paint were failures not of paint but of the painter, observed Mr. Greenwald. Moisture could enter the shale through a mere pinhole. E. R. Maize, of the Bureau of Mines, had observed a roof that had been adequately protected by paint, completely ruined by the drilling of holes for trolley hangers. G. J. Steinheiser, State inspector, stated that the Freeport bed in the Indiana County region was excellent until after submergence. On removing the water, the results were distressing. R. D. Hall, engineering editor, *Coal Age*, recalled a disastrous experience in the Red Ash bed in the Exeter mine, Pittston, Pa., and at a mine near Shamokin, and again at Beaverdale, Pa.

*Coal Ash for Concrete*—Bituminous coal, he added, is believed to swell in the presence of moisture to such a degree that the use of bituminous "coal ash" for concrete is prohibited in New York City. As all ashes contain some unconsumed coal, it may be that the coal in the ash or the unroasted impurities are the cause of the swelling and not the coal, but in England it has been found that some bituminous coal ash makes good ash concrete and some does not.

*Wetting Agents in Cutting Shale Bands*—It was suggested by Jerome C. White, assistant chief engineer, Monroe Coal Mining Co., that the rate of penetration was an important factor in the deterioration of shales, and in cutting shales mechanically it might be well to use a wetting agent, which might cause the shales to break down if penetration of the water were sufficiently rapid.

*Some Metals More Explosive Than Coal*—Explosions of magnesium, aluminum, iron and coal powders were demonstrated by Drs. H. R. Brown and Irving Hartmann, of the Bureau. The order of their explosive violence is as has been listed, with magnesium the most violent of all four. Others were titanium and zinc. Water spread on magnesium flakes increases its combustivity, but the use of a granulated pitch from coal tar will put out a blazing magnesium bomb, especially when the latter is rolled onto a surface coated with the pitch. The granules are such as will pass a 10-mesh sieve and be caught on a 35-mesh, for pitch, as dust, of course is violently explosive.

The new bill providing for regular and special Bureau of Mines inspections was signed May 7 of this year, declared Dan Harrington, chief, Health and Safety Branch of the Bureau, in a paper read by J. J. Forbes, chief engineer of the Federal Coal-Mine Inspection Division. Supervising inspectors will receive $4,600 yearly, rising to $5,600; assistant inspectors, $2,600; associate inspectors, $3,200; and inspectors, $3,800. Age limit is 55 years; five years' experience in coal mining and ability to pass a rigid physical examination are required. Each man accepted as an inspector is given six to eight weeks of intensive training.

*Better Care for Miner*—In his 60 years of service in the coal industry, hours of labor of mine employees have been reduced from ten to seven and their wages increased 159 percent, declared Thomas Moses, president, Mine Inspectors' Institute of America. On his first employment as mine manager, his first experience was with an injured miner who, brought to the top, found no place ready to receive him. As a rule the blacksmith's shop or the engine house would have been used, but the blacksmith shop was being dismantled, and the heat of the day made use of the engine house impossible, so he was laid out in the shade of a building. Then and there Mr. Moses decided to build what was perhaps the first first-aid hospital at an American coal mine. It was built out of wood from the blacksmith shop, 12x14 ft. in plan, and provided with hot and cold water and a linoleum-covered floor. Much favorable comment and illustration appeared in the inspectors' reports and he was quite proud of it until a doctor from headquarters looked it over and suggested that it should be burned down.

*What About Mine Inspector?*—A mine inspector is entitled to: (1) better compensation, (2) more security in employment, (3) pension on retirement at a given age, and (4) protection in his position from political influence. While mine workers' salaries have been advanced 159 percent, that of mine inspectors has risen only 39 percent. Some states are more liberal than others, but the average salary of inspectors is very low.

### How Much Do You Know?

*Quiz Programs*—Two years ago when he went to the Gibson mine, reminisced W. W. Dartnell, superintendent, W. J. Rainey, Inc., Bentleyville, Pa., a Holmes Safety Chapter was organized, though only 23 families lived near the mine. Many resided 20 to 30 miles away and the meeting had to be made attractive enough to induce them to drive that distance. A noon meeting had to be arranged, as the mine worked three shifts. Children and wives came with the employees, but the interest evoked made these meetings "must-dates" for them all.

Latterly, a quiz program has been instituted which has proved quite a drawing card, questions being asked on mining laws, first-aid rules and practice and highway safety applicable both to grown people and children. Each person called to the platform (usually there are only four) has a chance to answer three questions in turn provided he does not miss the first two. One money unit is given for answering the first question and, if it is correctly answered, opportunity is given to answer a second, for which two money units are given. For a correct answer to the third question, three money units are awarded. The questions are arranged to be progressively

### Coal Mining Institute Leaders

J. J. Forbes, chief engineer, Federal Coal-Mine Inspection Division, president; W. P. Vance, general superintendent, Butler Consolidated Coal Co., first vice president; G. J. Steinheiser, State mine inspector, second vice president; J. M. Conner, general superintendent, Allegheny Pittsburgh Coal Co., third vice president; E. R. Maize, associate mining engineer, U. S. Bureau of Mines, secretary-treasurer (G. W. Grove was elected but resigned because of his new duties). Directors for two years are: J. V. McKenna, State mine inspector; E. A. Siemon, division general superintendent, Hillman Coal & Coke Co.; C. A. McDowell, safety engineer, Vesta Coal Co.; C. W. Pollack, general manager, Ford Collieries Co.; S. M. Cassidy, manager, Weirton Coal Co.

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"In case an emergency of a similar nature again arises, it is a pleasure to know that we can depend upon cooperation of this kind."

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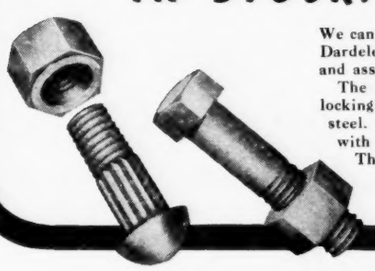

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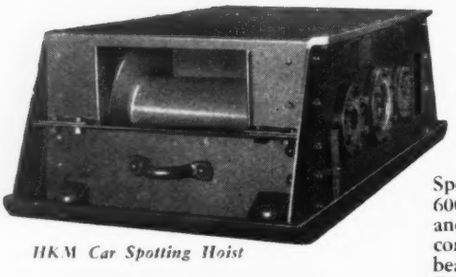

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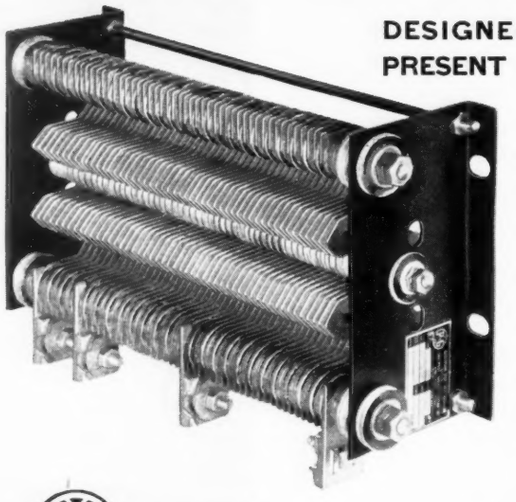

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difficult. Sometimes, the questioner suggests several answers and the answerer is required to declare which of them is correct.

Every person is asked a few preliminary personal questions as to his or her name and occupation, and then the real questioning is on subjects relating to the specific occupation of the person quizzed. Miners are questioned on miners' duties, motormen and drivers on their specific work. Picking of persons for questioning is by lot, drawn from a hat. Sometimes, when there is a regular program, only one person is interrogated.

Persons quizzed by Mr. Dartnell on his sample IQ program were T. P. McCarthy, general superintendent, Clearfield Bituminous Coal Corporation; H(andles) D(ynamite) Maginnis, E. I. duPont de Nemours & Co., and E. H. Johnson, Jeffrey Manufacturing Co. John Williams, secretary, Indiana County Council, said he takes back the money already received if a question is incorrectly answered. The first correct answer entitles the quizzed person to 25c., the next to 50c., and the third to 75c. Returned money goes to the jackpot. Mr. Williams sometimes questions seven persons per meeting and finds the quiz most helpful.

Good roads are the essential needs for trackless mining, and in some mines it is difficult to attain them, was the nub of the remarks of G. A. Shoemaker, general superintendent, Union Collieries Co., as delivered by Mr. Von Pelt. Drilling and charging before cutting was condemned in a symposium followed by discussion, but shooting several shots at one time was regarded with more favor. The first of these may be found in the Foreman's Question Forum section of this issue, p 60, and the second will appear next month in the same section.

### Wastes No Water on Coal

*Sprays Dust, Not Coal*—Ninety per cent of the coal dust in the air can be eliminated by sprays, declared J. A. Saxe, chief engineer, Island Creek Coal Co. Sometimes a coal face will fall or coal will be dropped too far in loading and there will be a surge of dust for a minute or so; but the dust can be cut to a tenth of its former density by suitable sprays. At the Island Creek mines, not the coal but the dust in the air is sprayed. In this way, no objectionable quantity of moisture is added to the coal. It is necessary to strain the water before it reaches the spray nozzles; otherwise they will clog. Compound M is being used with a concentration of one part in one thousand. Several allaying agents have been tried. The compound probably is not corrosive, but Island Creek has no experience in eight months of use, for the spray is not directed at the equipment.

*What Constitutes a Gassy Mine*—In West Virginia, said Chief Rhinehart of the Department of Mines, "gassy mines" are those in which accumulations of explosive gas have been known to exist in recent years or where 5 percent of explosive gas can be detected in any shothole or crevice or where any quantity of gas can be found in the mine air. "Slightly gassy mines" are those in which no explosive gas can be detected in the mine air, but some explosive gas, not to exceed 5 percent, may be found in shotholes or crevices. "Non-gassy mines" are those in which no explosive gas can be detected either in the mine air or in shotholes or crevices.

# Defense Savings Pay-Roll Allotment Plan

*How company heads can help their country, their employees, and themselves*

voluntary pay-roll allotment plan | helps workers provide for the future | helps build future buying power | helps defend America today

This is no charity plea. It is a sound business proposition that vitally concerns the present and future welfare of your company, your employees, and yourself.

During the post-war period of readjustment, you may be faced with the unpleasant necessity of turning employees out into a confused and cheerless world. But you, as an employer, can do something *now* to help shape the destinies of your people. Scores of business heads have adopted the Voluntary Pay-roll Allotment Plan as a simple and easy way for every worker in the land to start a *systematic* and *continuous* Defense Bond savings program.

***Many benefits . . . present and future.*** It is more than a sensible step toward reducing the ranks of the post-war needy. It will help spread financial participation in National Defense among all of America's wage earners.

The widespread use of this plan will materially retard inflation. It will "store" part of our pyramiding national income that would otherwise be spent as fast as it's earned, increasing the demand for our diminishing supply of consumer goods.

And don't overlook the immediate benefit . . . money for defense materials, quickly, continuously, *willingly*.

***Let's do it the American way!*** America's talent for working out emergency problems, democratically, is being tested today. As always, we will work it out, without pressure or coercion . . . in that old American way; each businessman strengthening his *own* house; not waiting for his neighbor to do it. That custom has, throughout history, enabled America to get things done *of its own free will*.

***In emergencies, America doesn't do things "hit-or-miss."*** We would get there *eventually* if we just left it to everybody's whim to buy Defense Bonds when they thought of it. But we're a nation of businessmen who understand that the way to get a thing done is to *systematize* the operation. That is why so many employers are getting back of this Voluntary Savings Plan.

Like most efficient systems, it is amazingly simple. All you have to do is offer your employees the convenience of having a fixed sum allotted, from each pay envelope, to the purchase of Defense Bonds. The employer holds these funds in a separate bank account, and delivers a Bond to the employee each time his allotments accumulate to a sufficient amount.

Each employee who chooses to start this savings plan decides for himself the denomination of the Bonds to be purchased and the amount to be allotted from his wages each pay day.

***How big does a company have to be?*** From three employees on up. Size has nothing to do with it. It works equally well in stores, schools, publishing houses, factories, or banks. This whole idea of pay-roll allotment has been evolved by businessmen in cooperation with the Treasury Department. Each organization adopts its own simple, efficient application of the idea in accordance with the needs of its own set-up

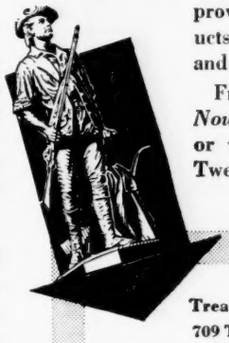
***No chore at all.*** The system is so simple that A. T. & T. uses exactly the same easy card system that is being used by hundreds of companies having fewer than 25 employees! It is simple enough to be handled by a check-mark on a card each pay day.

***Plenty of help available.*** Although this is *your* plan when you put it into effect, the Treasury Department is ready and willing to give you all kinds of help. Local civilian committees in 48 States are set up to have experienced men work with you just as much as you want them to, and no more.

Truly, about all *you* have to do is to indicate your willingness to get your organization started. We will supply most of the necessary material, and no end of help.

***The first step is to take a closer look.*** Sending in the coupon in no way obligates you to install the Plan. It will simply give you a chance to scrutinize the available material and see what other companies are already doing. It will bring you samples of literature explaining the benefits to employees and describing the various denominations of Defense Savings Bonds that can be purchased through the Plan.

Sending the coupon does nothing more than signify that you are anxious to do *something* to help keep your people off relief when defense production sloughs off; *something* to enable *all* wage earners to participate in financing Defense; *something* to provide tomorrow's buying power for your products; *something* to get money *right now* for guns and tanks and planes and ships.



France left it to "hit-or-miss" . . . and *missed. Now* is the time for *you* to act! Mail the coupon or write Treasury Department, Section A, 709 Twelfth St. NW., Washington, D. C.

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**Address** _____

*(This space contributed by* COAL AGE*)*

To find the gas the West Virginia Department of Mines is using at present methane testers with methane detectors as checking instruments. Each mine inspector carries a methane tester on inspections and makes tests at shotholes to determine the classification of the mine.

Since the reclassification, not a single "nongassy mine" has had an explosion. In those mines changed from the "nongassy" to the "gassy" or "slightly gassy" classification, there have been six or more explosions in which lives have been lost either before or after change of classification, though, at the time of the explosion, gas could not be detected by a safety lamp during regular examination by the officials.

"The safety lamp is still the best known means for detection of gas by officials making their regular examinations in mines classed as 'gassy' and where gas is reasonably expected, but it is not a reasonably safe instrument for use in the detection of gas for classification purposes." At present in West Virginia "slightly gassy mines" are treated as "nongassy" for most requirements but are watched for a possible change to a "gassy" classification.

All coal mines, asserted R. D. Currie, district engineer, General Insurance Corporation, are in fact gassy, differing only in degree; the term nongassy coal mine is a misnomer which has been corrected time and again when a so-called nongassy mine has been blown out of that classification by a violent gas explosion.

### Call All Mines Gassy

Concluding that all coal mines should be classed as gassy, M. J. Aukeny, senior mining engineer, Safety Division, U. S. Bureau of Mines, said that 117 coal-mine explosions have occurred in so-called nongassy or open-light mines during the 13 years 1929-1941 inclusive, which is 35 percent of all the mine explosions that occurred during the period.

In a mine producing Upper Freeport coal, said G. J. Steinheiser, State mine inspector, a test made about three miles from the main drift under 200 ft. of cover showed no methane in any roof or face tests when made in a room driven by conveyor mining three seven-hour shifts every 24 hours and advancing eight to nine cuts, each 5 to 6 ft. deep. The detector tube was run 4 ft. into a 5½-ft. hole and the detector showed 0.05 percent of methane. Ten minutes later the reading was the same.

Another test in the same seam was made about four miles from the main opening with a cover of 80 to 100 ft. at the face of a single-shift hand-loading room advancing about 6 ft. in 24 hours. The detector showed face and roof readings zero and a reading with the tube extending 4 ft. into a newly drilled hole barely moved the hand away from the original setting. In another heading with cover up to 200 ft., the detector showed zero with the hose 1 ft. in the hole, 0.2 with the hose 2 ft., and 0.4 with the hose 4 ft. in the hole. In another mine in the same seam with 200 to 300 ft. of cover from a drillhole standing from Friday to Monday, the air gathered by a hose 18 in. in the hole showed 5 percent, yet there was no distinguishable gas anywhere in the room. The room is worked by hand and advances 5½ ft. in a 24-hour period.

Mr. Steinheiser advocated that all mines opening up or operating away from the outcrop be classed as gassy and so equipped, operated and supervised, but he did not think that the many mines in the mountain regions that are working coal seams from under hills where the coal outcrops all around the hill should be so included.

At the banquet, Dr. R. R. Sayers, Director of the U. S. Bureau of Mines, discussed the progress being made in locating and developing strategic minerals, and Richard Maize, Pennsylvania State Coordinator of Mines, priorities and their relation to the coal industry. Mr. Maize referred to the necessity for policing the mines against sabotage, saying that the police would be licensed by the State on application to Clyde Greenough, the Attorney General. It would be necessary also to watch the water supplies of coal mines. Powder salesmen would be licensed. A larger quantity of explosives had been sold for mine use at one mine than had been used for bringing down coal and rock.

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## Safety, Personnel and Mining Advances Feature Indiana Institute Meeting

WITH FOUR of the more important subjects in the coal operator's dictionary on the program, the Indiana Coal Mining Institute held its eleventh annual meeting Dec. 6 at the Terre Haute House, Terre Haute, Ind. H. A. Cross, general superintendent, Walter Bledsoe & Co., and retiring institute president, wielded the gavel. Speaker of the evening at the annual banquet was Dr. M. M. Leighton, chief, Illinois Geological Survey, whose topic was "Getting Ready for the Future." At the close, the John A. Templeton Safety Trophy was awarded to the Little Betty Mining Corporation, Linton, Ind., for the best safety record in the State for the year 1941. Receiving the award for his company, P. L. Donie, vice president, praised the work of his organization, without which the record could not have been achieved.

Citing certain research results in coal and other industries and pointing out that economy in use still is being achieved, Dr. Leighton outlined some of the possibilities for coal and other mineral resources. New techniques in production and use will come out of the war effort, and the question is, "How will it affect the mineral industry?" Research will supply part of the answer. We should go forward, Dr. Leighton asserted, "with an absence of fear for the future."

If the accident rate is any indication, Indiana mines have shown little progress in safety since record keeping was started by the State Bureau of Mines and Mining, declared Henry S. Wallace, director. The rate was 2.04 in 1889, 2.12 in 1940, and all the way up and down from the low of 1.24 in 1922 to the high of 7.59 in 1938. "These figures show that the coal industry of Indiana needs an injection . . . to stimulate more interest in safer working conditions."

The owner or operator must be sold on safety before it can be had in a mine. Time out for him to figure all the costs of a fatal accident in insurance premiums, loss of tonnage and lower employee morale would be well spent. The false impression in the mind of the employee that the company thinks more of a ton of coal than of him must be eliminated before full cooperation can be obtained.

The operator must set his house in order, draw up safety rules to fit his conditions and put them into effect before obtaining cooperation. This can best be achieved through the section foreman, who is the man in touch with the worker. A step-by-step penalty culminating in discharge should be applied to those wilfully violating safety rules after being talked to.

Vocational training, safety chapters, first-aid training (which should be compulsory and repeated every two years) and instruction in rescue and recovery work all are steps to safety. Safety can be had if the owners, management and labor will work to the same goal. Because of the war, unrest and limited supplies, men in the industry must tighten their belts and fight together to win.

Experience with battery-powered Joy shuttle cars at the new Ditney Hill mine of the Ingle Coal Co., Elberfeld, Ind. (see p. 52 of this issue), was briefed by Alva Harris, superintendent. Natural conditions include grades up to 4 to 6 percent, fireclay bottom, wet conditions at times and occasional faults to be removed and disposed of. Conditions introduced by the management include dustless shuttle-car roads, long turns at room necks and 1,000- to 1,200-ft. limits on round trips. Flake calcium chloride is used in making roads dustless. It unites with the coal dust to make a tough, hard roadbed, which is dragged frequently with a shuttle car to keep it in shape.

Two shuttle cars serve each Joy loader and deliver to a Joy transfer elevator for loading mine cars. A ramp has been tried, but the elevator has been found cheaper and more satisfactory. It can be moved in 4 to 5 hours, while preparation for a ramp is much slower and more expensive. The

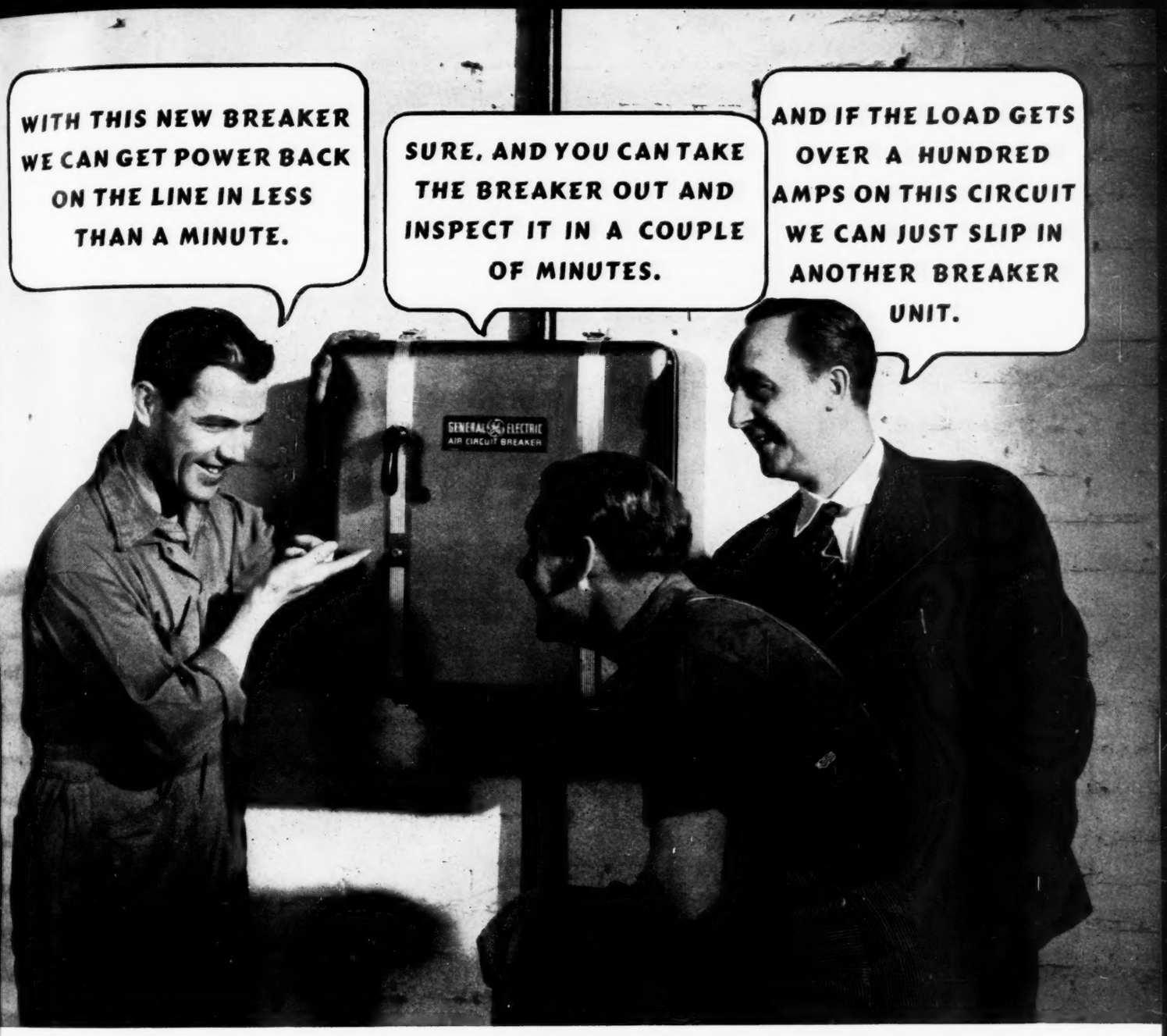
### Indiana Officers

A. K. Hert, general superintendent, Snow Hill Coal Corporation, was elected president of the Indiana Coal Mining Institute at its Dec. 6 meeting. He succeeds H. A. Cross, general superintendent, Walter Bledsoe & Co. Other officers and executive-board members are:

Vice Presidents—D. W. Jones, superintendent, Princeton Mining Co.; Birch Brooks, superintendent, Saxton mine, Walter Bledsoe & Co.; and H. M. Ferguson, president, Clinton Coal Co.

Secretary-Treasurer — Harvey Cartwright, commissioner, Indiana Coal Operators' Association.

Executive Board—Crede Fitzpatrick, Black Hawk Coal Corporation; Peb G. Conrad, Knox Consolidated Coal Corporation; Fred Bieler, Snow Hill Coal Corporation; J. W. Anstead and H. A. Keenan, Templeton Coal Co.; and Harry Cruikshank and H. A. Cross, Walter Bledsoe & Co.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transfer stations are kept close to the face. For more even loading and less spillage, the elevator is set at 45 deg. to the track.

Shuttle cars are checked and examined at the end of the shift, at which time the batteries are changed, requiring 20 to 30 minutes. For charging, batteries are hauled to the bottom on a special truck. A charge is good for 60 to 70 trips in a shift. Some advantages for shuttle cars cited by Mr. Harris are elimination of room-track cost and upkeep, convenience in removing refuse material to worked-out places and ease in bringing timber into working places. Experience to date indicates that tire cost is much less than trackwork. Some tires have been snagged but none have worn out.

Responding to questions upon completion of his paper, Mr. Harris stated that machine cuttings and calcium chloride are used to fill soft spots in shuttle-car roads, with plank corduroy in the worst places. The maximum grade a shuttle car will operate over is 12 percent. Three shuttle cars hauling 130 loads against 500 ft. of 4-percent grade ran their batteries down in seven hours.

"Haulage capacity is one of the most important factors in the efficient operation of mechanical-loading equipment," declared Harry Keenan, superintendent, Peerless mine, Templeton Coal Co., in a brief résumé of experience with big cars and a transfer hopper. The Peerless installation will be described in an article in an early issue of *Coal Age*. With thinner coal necessitating a reduction in the already low 3,900-lb. capacity of the original wood cars at Peerless, where large lumps increase the need for plenty of clearance, the management embarked on a study of possible measures to remedy the situation. As a result, ten 8-ton 3-door drop-bottom cars were purchased to operate in connection with a transfer station for reloading the coal into the original small cars.

Three track loaders are served by this installation and produce 1,200 tons per shift. Under the former set-up, these loaders turned out only 900 tons per shift. Two of the loaders have been served at a distance of 3,500 ft. and one at 1,500 ft., producing on this basis, 1,000 tons per shift. The two most distant machines were served by four cars each and the other by two cars. Round-trip time to the farthest loader was about eight minutes, during which the machine had two cars available for loading. "Fifty car changes produced the same tonnage which formerly required 200 changes." Locomotive maintenance was substantially reduced, along with maintenance of the small wood cars.

"Fewer car changes and increased loading time have boosted production without the prohibitive expense of remodeling the existing shaft and hoisting equipment and widening 1½ miles of narrow haulageway. In addition, the following advantages may be cited:

"1. Less storage space required in adjacent rooms and entries under development.

"2. Ten large cars made unnecessary the purchase of a greater number of small cars.

"3. Better trimming of cars reduced road cleaning.

"4. Last, but not least, safety was promoted in that fewer car changes reduced the coupling and car-handling hazards."

### Personnel Important

"Coordination of manpower, management and machines puts a premium on trained personnel," declared R. C. Adams, vocational director, Gerstmeyer Technical High School, Terre Haute, in discussing vocational training for mine employees under the direction of the State Department of Vocational Education and Kirk V. Cammack, Indiana State Teachers' College. Approximately 1,500 miners have taken training at the ten centers in the State.

Men from the Terre Haute group of mines have taken eleven different courses ranging from mine surveying to welding and 68 out of 125 queried have reported substantial benefits. The work also has been praised by Louis Austin, president, District 11, United Mine Workers, and Henry S. Wallace, director, Bureau of Mines and Mining.

"Proper timber clearance, good track where track is used, proper care of machinery, cutting in the right manner and placing of drillholes to balance shots and square up faces all are part of a well-laid plan of face preparation," stated George Guiney, foreman, Kings mine, Princeton Mining Co., Princeton, Ind. Both shortwall and track-mounted machines are used at Kings, where some shearing also is done. Some mines in the State use snubbing pans to improve the grade of coal and reduce digging by the loader.

Mines where cutting is possible with 8- or 9-ft. bars use this method of increasing tonnage per fall. Cutter chains designed to remove the most coal per revolution increase the size of cuttings and reduce the quantity

Harvey Cartwright, secretary, stands up with H. A. Cross, retiring institute president.

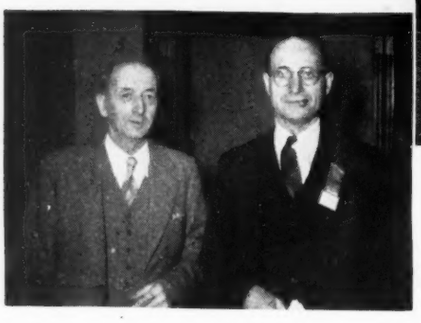
Henry Wallace (center), Indiana Bureau of Mines and Mining, looks things over with E. S. Rogers and Henry Ahlemann.

George Guiney, foreman Princeton Mining Co., relaxes after analyzing face preparation

H. P. Nicholson, University of Illinois, in a considering mood.

A. K. Hert, new institute president.

Cloyd M. Smith, editor, Mechanization, talks things over with D. W. Jones, superintendent, Princeton Mining Co.



Jack Ogilvie, Lynch Coal Operators' Reciprocal Association, pauses to pose with George Sermersheim.

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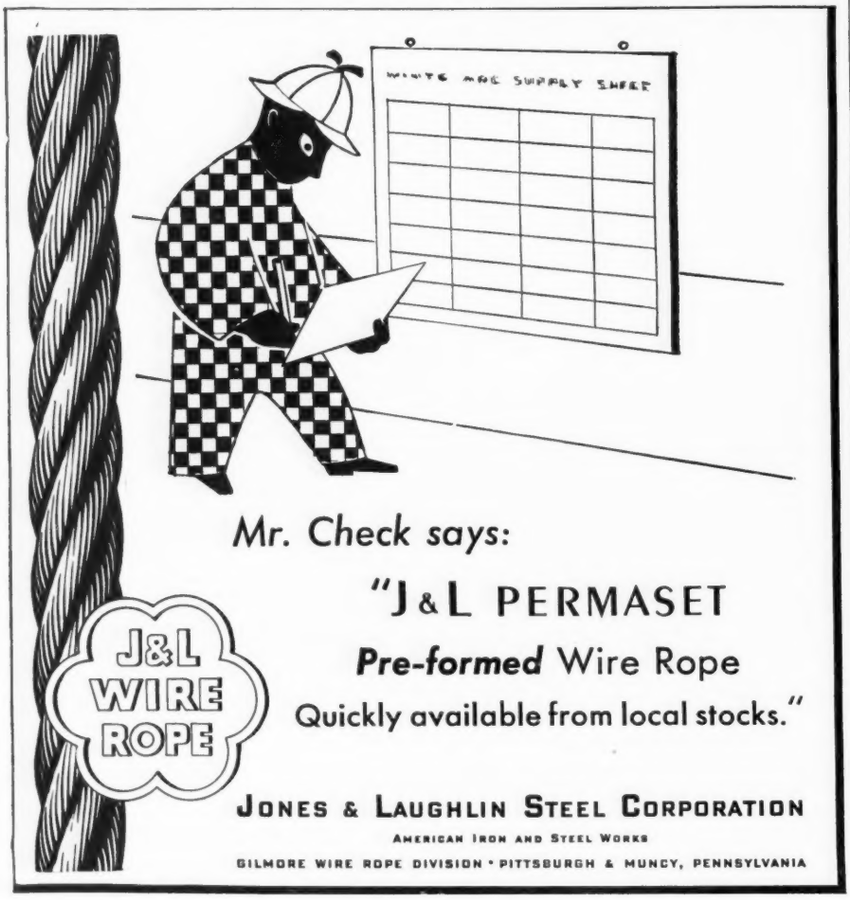
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of carbon. Shortwall feed has been increased from 16 to 28 in. per minute with the same chain speed. Chain lacings were left in the original 9-position wedge state. One machine has been rearranged for 7-position straight wedge operation for more coarse coal. Chain lacings will be changed to 9-position staggered wedge to increase still more the coarse-coal yield. From one of these 8½-ft. cuts (5½-in. kerf across a 26-ft. room) about 5 tons of cuttings result. Bars making a thinner kerf have been tried, but weakness of the bar and chain and lack of space for the coal to fall made them less desirable.

Shearing is done in Indiana mines for various reasons, including production of more coarse coal, making possible deeper cuts in thin coal and providing an easier opening through a fall. Shear cuts usually are made near the center where the face is cut in a circle, and over the right rail or near the right rib in narrow places. When over the right rail, shots may be balanced by placing three on the left side and two on the right. Shearing does not always extend to the top because of impurities and hard sulphur. Shearing on the right rib insures the loading-machine operator of freedom from the hazards of loose rib shots.

Several methods of breaking down the coal are used. Among them is powder—the oldest and most widely used—Cardox and Airdox. Airdox is popular in Indiana not so much for large coal but to advance entries faster, as it is the only method approved for breaking coal down on the shift. Last fall, Kings shot eight out of ten room territories with Airdox. Screenings now are less with only four Airdox machines and the rest of the tonnage from powder. Shearing is done in some territories using powder, the percentage of large sizes being a little lower. In three territories, seam thickness is less than 6 ft. and the coal has to be broken smaller to get it over the loader.

Bottom holes are charged as lightly as possible, since the clean lump comes from the lower part of the seam. Shortwall cuts are not sheared, the number of drillholes depending upon the width. Gripping holes are avoided where possible, Mr. Guiney stated, and cuttings are cleaned out of the kerfs. Timbers are set 3 ft. from the right rail and 2½ ft. from the left. All places are timbered to within 12 ft. of the face before cutting, or closer if necessary.

Each type of loading machine needs a different type of preparation, declared Birch Brooks, superintendent, Saxton mine, Walter Bledsoe & Co., Terre Haute, in the course of the discussion. Pointing out that shearing maintenance is high, he asked why shearing is necessary in a 4-ft. vein when the lumps cannot be loaded anyway. Airdox was installed at his operation to speed the rate of entry driving. As an example, 1,200 ft. of entry was driven in 50 days, an average of 24 ft. per double shift.

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### Bureau of Mines Approval

One approval of permissible equipment was issued by the U. S. Bureau of Mines in November, as follows:

Goodman Mfg. Co.—Type G-15-B-74 shaker conveyor; 15-hp. motor, 500 volts, d.c.; Approval 388-A; Nov. 25.

# Mine Workers Win Captive Mine Dispute; Arbitrators Grant Union Shop

IN A DECISION arrived at on Dec. 7 the three-man board named by President Roosevelt to arbitrate the union shop dispute in the captive coal mines reversed the decision of the National Defense Mediation Board and ruled that all workers in the captive mines should be required to join the United Mine Workers as a condition of employment. Dr. John R. Steelman, on leave of absence from his post as director of the U. S. Conciliation Service to act as chairman of the board, and John L. Lewis, president of the miners' union, voted for extension of the union shop provision of the Appalachian agreement to the captive mines. Benjamin F. Fairless, president of the United States Steel Corporation, dissented.

Nevertheless, Mr. Fairless agreed to have the Steel Corporation's coal-mine subsidiaries put the ruling into effect. The decision ended a series of disputes in which Mr. Lewis repeatedly ignored pleas by the President by calling strikes that hampered the production of steel. The board held sessions extending over nine days at the Commodore Hotel, New York City.

Dr. Steelman explained his vote for the union shop by pointing out that 95 percent of the captive miners had voluntarily become U.M.W. members and that 99.5 per cent of all the coal miners in the country were now on its rolls. As most of the industry, including many captive mine operators, was already operating under the union shop, he insisted it could not be argued that the U.M.W. was endeavoring to take advantage of the national emergency to change the status quo.

In its 9-to-2 decision against the miners' union, the Mediation Board, said Dr. Steelman, had recommended against the union shop simply because the board did not feel that workers should be made to join the union through government compulsion. The arbitration panel, he contended, was functioning independently of the government and was, therefore, in a position to make a decision based solely on the merits of the dispute.

On the other hand, Mr. Fairless maintained that the decision ran counter to President Roosevelt's pledge before Mr. Lewis called his third and last strike in the captive mines that the government never would compel the 5 percent of non-union members to join the union against their wishes. He recalled Mr. Roosevelt's statement that such action on the part of the government would be "too much like the Hitler methods toward labor."

"In view of the constitution of this board of arbitration and the appointment of its members by the President of the United States," said Mr. Fairless, "that decision is bound to be considered as the imposition of a closed shop by government action. In my opinion, the Congress, in these days of national emergency, should alone undertake to change a long-established open shop into a closed shop, or a closed shop into an open shop. Furthermore, deliberate and wise action on a complicated and controversial issue cannot be expected when all of us are, or should be, straining every effort to attain our paramount objective—namely, complete national security and the destruction of Hitlerism."

Instead of maintaining the status quo, asserted Mr. Fairless, the decision necessitated a complete reversal of the opposition of the steel companies to any form of closed shop. He said the decision violated "the fundamental right" of the American worker to a job whether or not he belonged to a particular organization and that it had the effect of further imposing "an unregulated labor monopoly" upon the whole bituminous coal industry. He expressed the belief that the decision would reopen controversy over the closed shop in all sections of American industry and cause "unnecessary labor unrest and agitation, with the consequent curtailment of production of various materials vitally needed for national defense."

*Associated Press Photo*

**John L. Lewis (left), United Mine Workers president, and Harry Moses (right), head of the captive coal operations of the United States Steel Corporation, sign an agreement giving the U.M.W. a union shop in the company's mines.**

Deprecating the argument that a closed shop was essential to the security of the United Mine Workers, Mr. Fairless declared that the award interfered with the right of workers under the Wagner Act to choose their own collective bargaining representative.

Mr. Lewis maintained, however, that the decision justified the position taken by the union throughout the controversy.

Companies that committed themselves to accept the ruling of the arbitration board, in addition to United States Steel, included Bethlehem, Republic, National, Wheeling, Crucible, Woodward Coal & Iron, and Youngstown Sheet & Tube. The Semet-Solvay Co., operating two commercial mines, one in West Virginia and one in Kentucky, also agreed in advance to abide by the decision.

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## High Court Rules Seaboard Mines Subject to Coal Act

In a decision rendered on Dec. 15, the U. S. Supreme Court refused to exempt certain coal-mining operations of the Seaboard Air Line R.R. from minimum price provisions of the National Bituminous Coal Act. Receivers for the company sought exemption under a contract arrangement which the government charged invited the return of cut-throat competition to the coal industry.

The court was divided six to three, with Justice Reed delivering the majority opinion. Justice Roberts, who read the dissent, was joined by Chief Justice Stone and Justice Byrnes. Justice Jackson did not participate.

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## Explosives to Be Controlled

Prevalence of a state of war makes effective the Federal Explosives Act of Oct. 6, 1917, which prohibits the manufacture, distribution, storage, use or possession of explosives, or the ingredients of explosives, unless a license has been obtained from the U. S. Bureau of Mines. Exempted are explosives used by the armed forces.

A revised version of the 1917 act has been passed by both houses of Congress and the measure is now in conference to smooth out a minor difference. In its essentials, however, it is similar to the original law. Personnel to act as licensing officers for the Bureau are now being selected, forms are being printed, and all other preparations are being made to put the provisions of the law into operation, according to Dr. R. R. Sayers, Director of the Bureau of Mines.

By the terms of both the 1917 and 1941 acts the superintendent, foreman or other duly authorized employee at a mine may, when licensed to do so, sell or issue to any workman under him such a quantity of explosives or ingredients as may be required by any workman in the performance of his duties. The act also prohibits trespass on property where explosives are manufactured or stored, and authorizes the Bureau of Mines to investigate all explosions and fires which may occur in mines, factories, etc., in which explosives are manufactured, stored or used. Violations of the act are punishable by fine or imprisonment or both.

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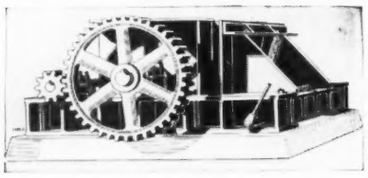

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## Solid Fuel Groups Give Consent To Advisory Committee

Representatives of the solid fuels industry, conferring in Washington Dec. 18 with Secretary of the Interior Harold L. Ickes, acting in the capacity of Solid Fuels Coordinator, agreed to form a 17-member industrial committee to serve with Mr. Ickes in an advisory capacity and pledged 100-percent cooperation in production. It was agreed to include in the committee three representatives of the bituminous and two of the anthracite industry, one for coke, two for labor, one for the tidewater dock operators, one for lake dock operators, one each for retail and wholesale dealers, two for railroad transportation groups, and one for other transportation; two persons not connected with the prduction, transportation or distribution of coal will represent the public interest.

Such a committee, according to Mr. Ickes, would not be large enough to be unwieldy, and he said it could be fairly representative of all the interests involved. Members will be appointed by Mr. Ickes from names recommended by the groups represented on it, and will work with the coordinator and those associated with him in the war-time administration of the solid-fuel industry. Organization will proceed as rapidly as possible, the coordinator said.

Howard A. Gray, director, Bituminous Coal Division, was named by Secretary Ickes on Nov. 24 as acting director of Solid Fuels Coordination (*Coal Age*, December, p. 108), and he will be assisted by associate directors for bituminous coal and for transportation and assistant directors for anthracite and coke, and a small general staff.

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## Personal Notes

I. M. Charles has been appointed chief engineer by the Union Pacific Coal Co., vice H. C. Livingston, promoted. Mr. Charles joined the company's engineering force in June last as assistant to Mr. Livingston.

Fred Colvin has been made night foreman for the Consolidation Coal Co. at its mine at Monongah, W. Va.

W. A. Gallagher has resigned as superintendent for the Minds Coal Mining Corporation at Monterville, W. Va., to accept an appointment as senior mine inspector with the Inspection Division of the U. S. Bureau of Mines and will be stationed at Vincennes, Ind.

Harry Hall has been made acting mine foreman at the Barracksville (W. Va.) mine of the Industrial Collieries Corporation.

Leo Healey, formerly assistant superintendent at Eddy Creek colliery of the Hudson Coal Co., Olyphant, Pa., has been made superintendent at Baltimore No. 5, Parsons, Pa.

J. A. Hunt, Beckley, W. Va., who was president and general manager of the Lillybrook Coal Co. until he sold his interest therein, has been appointed vice president in charge of operations of the New River Co., which maintains operating headquarters at Mount Hope, W. Va.

James Ireland has been named superintendent of the Piney Fork mine of the Hanna Coal Co., Piney Fork, Ohio.

Kenneth A. Lambert is back on the job as superintendent at the Loree division of the Hudson Coal Co. with preparations under way for reopening the collieries in this division. While this division was inactive Mr. Lambert was in charge in the company's lower section.

Joseph Latz has been promoted from section foreman to general night foreman at the Owings (W. Va.) mine of the Consolidation Coal Co.

H. C. Livingston, chief engineer of the Union Pacific Coal Co., has been advanced to general superintendent in charge of all construction and general mining. He has been with the company since 1927, being appointed chief engineer in August, 1940.

Joseph Martin, formerly at the Gravity Slope colliery of the Hudson Coal Co., Archbald, Pa., has been made assistant to Kenneth A. Lambert, superintendent of the Loree division.

Walter Petzel has been made assistant superintendent at the Eddy Creek colliery of the Hudson Coal Co., Olyphant, Pa., vice Leo Healey, promoted.

Ray L. Phelps, formerly with the Lorain Coal & Dock Co., Columbus, Ohio, has been appointed manager of the Fairmont (W. Va.) office of the Bituminous Coal Division, vice Carl Riggs. Mr. Phelps was at one time statistical director of the Fairmont office of the National Bituminous Coal Commission.

Carl Riggs, manager of the Fairmont

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(W. Va.) office of the Bituminous Coal Division, has been made WPA administrator for West Virginia.

BAIRD SNYDER was named acting administrator of the Wage and Hour Division by Secretary of Labor Frances Perkins on Dec. 13. Mr. Snyder, who was Deputy Administrator under General Philip B. Fleming, now Federal Works Administrator, will head the division until further notice.

WESLEY STONEBREAKER, who was employed in the Olyphant colliery of the Hudson Coal Co. until recently, has been made inside foreman at the company's Baltimore No. 5 colliery, Parsons, Pa.

W. P. VANCE, general superintendent, Butler Consolidated Coal Co., was elected president of the Coal Operators' Association of the Thick Vein Freeport Seam of Pennsylvania at its annual meeting, on Dec. 9. C. W. POLLOCK, general superintendent, Ford Collieries Co., was named vice president, and G. C. TREVORROW, general superintendent, Duquesne Light Co., was chosen secretary-treasurer.

•

## Sahara Is Sinking New Slope

Sahara Coal Co. is sinking a new slope mine, to be known as No. 16. This is near the original Blue Bird shaft mine, 4 miles west of Harrisburg, Ill., and alongside the rail connection that leads to the Sahara strip mine near Carrier Mills.

•

## Crescent Coal Control Passes

Justin Potter and John Amos, two figures well known in the coal industry, have acquired control of the Crescent Coal Co., Central City, Ky., and have taken over its management as president and vice president, respectively.

•

## Importance of Upkeep Stressed At Monongahela Institute

Stressing the importance of maintenance as outstanding to a nation at war, Captain Donald L. Sibray, of the Morgantown Ordnance Works, addressing nearly 500 persons at the 15th annual banquet of the Monongahela Valley Coal Mining Institute, held Dec. 13 at the Hotel Morgan, Morgantown, W. Va., urged that greater care than ever be given to machinery needed to operate coal mines. "War," he said, "is won not only at the front but at home. We've got to produce coal and steel." He pointed out, however, that, as steel is in great demand, to obtain replacement parts often entails delay; hence the men should exercise the utmost care in the use of machinery.

G. B. Blackburn, district manager, Monongahela System, Morgantown, newly elected president of the institute, said important duties lie ahead of the coal industry. "We'll do our part," he added, "and I'm sure we can depend on the men to help."

Expressing appreciation for the cooperation of the workers, N. P. Rhinehart, chief of the West Virginia Department of Mines, said that the State this year is making its best safety record in the coal mines, and that "this month is the best ever."

Others who spoke were G. M. Kintz, representing J. J. Forbes, chief engineer of the Coal-Mine Inspection Division of the U. S. Bureau of Mines, and E. C. Murray, president of the Central West Virginia Mining Institute.

Dr. Charles E. Lawall, president of West Virginia University, who acted as toastmaster, declared that no group can do more for the nation than the men in the mines. "We have the men, the steel and the mass production necessary to win this war," he asserted.

Officers named for the new year, besides Mr. Blackburn, are: vice presidents—Alex Bryce, State mine inspector; George Benson; James F. Trotter, vice president, Davis-Wilson Coal Co.; Samuel Pursglove 3d, safety director, Pursglove Coal Mining Co.; Fred O. Johnson, superintendent, Rosedale Coal Co.; secretary, E. D. Gall, superintendent, Arkwright Coal Co.

## Keeping Step With Coal Demand

### Bituminous Coal Stocks

| | Thousands Net Tons Nov. 1 1941 | P.C.Change From Oct. 1 1941 | P.C.Change From Nov. 1 1940 |
|---|---|---|---|
| Electric power utilities | 11,919 | + 2.4 | + 5.4 |
| Byproduct coke ovens.. | 8,435 | +15.7 | —13.1 |
| Steel and rolling mills. | 909 | + 9.9 | +37.7 |
| Railroads (Class I).... | 9,548 | + 8.9 | +73.8 |
| Other industrials*..... | 20,751 | + 6.2 | +35.6 |
| Total ..... | 51,562 | + 7.3 | +21.2 |

### Bituminous Coal Consumption

| | Thousands Net Tons Oct. 1941 | P.C.Change From Sept. 1941 | P.C.Change From Oct. 1940 |
|---|---|---|---|
| Electric power utilities. | 5,945 | + 7.1 | +23.5 |
| Byproduct coke ovens.. | 6,983 | + 2.5 | + 0.8 |
| Steel and rolling mills. | 886 | +10.5 | + 1.8 |
| Railroads (Class 1).... | 8,742 | + 8.5 | +18.9 |
| Other industrials*..... | 12,386 | +15.7 | +19.4 |
| Total ..... | 34,942 | + 9.0 | +15.2 |

* Includes beehive ovens, coal-gas retorts and cement mills.

### Coal Production

**Bituminous**

| | |
|---|---|
| Month of November, 1941, net tons ..... | 42,865,000 |
| P.c. increase over Nov., 1940.. | 7.1 |
| Jan.-Nov., 1941, net tons..... | 454,473,000 |
| P.c. inc. over Jan.-Nov., 1940... | 10.3 |

**Anthracite**

| | |
|---|---|
| Month of November, 1941, net tons ..... | 3,832,000 |
| P.c. decrease from Nov., 1940.. | 3.7 |
| Jan.-Nov., 1941, net tons..... | 50,233,000 |
| P.c. inc. over Jan.-Nov., 1940.. | 7.7 |

### Sales of Domestic Coal Stokers vs. Oil Burners

| | Coal Stokers | Oil Burners |
|---|---|---|
| October, 1941..... | 22,888 | 18,381 |
| P.c. change from Oct., 1940 ..... | —10.6 | —41.5 |
| January-October, 1941 | 170,791 | 171,738 |
| P.c. change from Jan.-Oct., 1940 ..... | +29.1 | +9.7 |

### Index of Business Activity*

| | |
|---|---|
| Latest week..... | 164.8 |
| Percent change from month ago.... | + 3.2 |
| Percent change from year ago..... | +15.2 |

* *Business Week*, Dec. 20.

### Electrical Power Output†

| | |
|---|---|
| Week ended Dec. 13, kw.-hr.. | 3,431,328,000 |
| P.c. change from month ago. | + 6.2 |
| P.c. change from year ago... | +14.2 |

† Edison Electric Institute.


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# Barnesboro Mining Institute Entertained by Papers on Shuttles, Mine Law and Labor

HOW, by reason of mine laws, inspection, education and cooperation, fatalities per million tons of bituminous coal produced have dropped from 9.95 in 1877 (and 3.84 in the year following) to about 1.3 in the present year; how and what precautions must be taken to make operation with loaders and shuttle cars successful; how many so-called flameproof machines, sold before the U. S. Bureau of Mines formulated its standards, need a degree of reconstruction to make them safe; how labor, having pressed more drastic mining laws and the certification of miners on the coal operator, is in honor bound to cooperate in assuring safety, and how priorities and the draft lay responsibilities on the operator were the five highlights in the five-hour rapid-fire 29th annual session of the Mining Institute of the Fifteenth Bituminous District, Barnesboro, Pa., Dec. 6.

*No Laws Prior to Disaster*—In 1858 a vain appeal was made to the State of Pennsylvania for passage of a law to provide official supervision of mines, asserted W. G. Thomas, Deputy Secretary of Mines; it never even came to a vote. Another bill followed in 1866; accepted by the lower house, it was defeated in the Senate, but was reintroduced and passed by both houses and approved by the Governor in 1869. It applied only to Schuylkill County and provided only one inspector; no safeguards were prescribed; the establishment of rules was left to him.

### Avondale Mine Disaster

When 179 men were suffocated in the Avondale shaft in Plymouth, Pa., 1869, and this loss was paralleled by a British accident where 250 men were killed by the closing of a shaft that served for both ingress and egress, acts were passed in Great Britain and for the anthracite mines of Pennsylvania requiring two openings to every mine, the law in Pennsylvania being passed in 1874. It ordered the appointment of inspectors to enforce the law which now was made to cover the entire anthracite region. The second law, enacted March 3, 1870, required two openings in every seam being worked and other safety provisions.

*Law Applied Only to Mercer County*—On April 20, of that year, a third law was passed applying only to Mercer County, where only bituminous coal was mined. The law of June 18, 1885, embraced all anthracite mines. But, before that time, the first general bituminous mining law was passed in April 18, 1877; and was revised June 30, 1885, and May 15, 1893. Amendments followed at various times and a general revision was passed in June, 1911, with a section covering the use of electricity. "Almost a quarter of a century," said Mr. Thomas, "has elapsed since the present bituminous law was enacted, the longest period any previous mining law was left on the statute books without rewriting, but it is my opinion that a large number of fundamentals of the present law should be retained as a basis on which to write a new law." Some amendments have been so carelessly written, he added, that they conflict with other provisions.

*Decline in Fatalities*—In 1907, the saddest year the bituminous mines ever experienced, there were 20 inspectors in that industry or one inspector for 7,477,533 tons, with a fatality for every 185,557 tons produced. The bituminous tonnage per inspector and the number of inspectors have varied greatly; in 1940, the number of inspectors was 25 and the production per inspector 4,456,677 tons, with one fatality for every 592,643 tons. (Later at the banquet, Richard Maize, Secretary of Mines, said that the number of tons per fatality in 1941, he expected, would be over 700,000 and that he hoped 1,000,000 tons would be achieved per fatality in 1942).

In 1903, when the Department of Mines was created, 145,237 tons of anthracite was produced per fatality, declared Mr. Thomas, and there were 15 anthracite inspectors. In 1940, with 24 such inspectors, 286,258 tons was mined per fatality.

*Department's Attitude on "Flameproof" Machines*—An explosionproof, or flameproof, mining machine, asserted J. F. Conrad, electrical inspector, Pennsylvania Department of Mines, is one that when completely filled with an explosive mixture of methane and air will, on the explosion of that mixture, entirely confine the products of such explosion within the casing or discharge them in such manner that they cannot ignite a mixture of methane and air, even though that mixture entirely surrounds the points of discharge and is combined in proportions most sensitive to ignition. To be acceptable to the Pennsylvania Department of Mines, flameproof machines for use in the mine must afford as much protection as permissible machines, but many of them designed before the establishment of the testing station of the U. S. Bureau of Mines at Pittsburgh do not give that protection.

*Rebuilding Required*—To condemn such machines in their entirety would ruin many coal companies and perhaps work severe hardship to a large number of workers and their families, but such defective machines cannot be allowed to continue to operate in their substandard condition. They must be rebuilt so as to conform as nearly as possible to the prescribed requirements of permissible machines, and permission must be obtained from the district inspector before they are again placed in service. Permissible machines may become damaged and substandard, but, when properly rebuilt and adequately maintained, will offer the same degree of protection as modern machines.

Permissible machines are not considered permissible if the plates attesting their permissibility have been removed, but even if they have permissible plates they will not be accepted by the department as permissible if their condition is such that their safety is impaired. Their plates will not save them or the miners working with them. Valuable time will be saved and a greater degree of safety maintained if those who contemplate installation of explosionproof machines advise the Secretary of Mines, his deputy or their district inspector of their intention before attempting to make any mechanical or electrical changes in such machines.

### Stagger System Condemned

*Difficulties With Six-Day Week*—At Logan No. 4 mine, Beaverdale, Cambria County, said A. B. Crichton Jr., superintendent, Johnstown Coal & Coke Co., the mine works three shifts daily but only for five days a week. For a time the mine was operated six days per week by staggering the men, and the mechanics worked seven days a week. The mechanics couldn't catch their breath on repair and maintenance work and the management had no opportunity to meet the mine officials as a group, so the increase in the accident rate was appalling. Consequently, the six-day week was abandoned, and within two weeks more coal was being produced in five days than had been mined in six days. The stagger system wouldn't work unless the entire crew was staggered. For success, the coordination of men in a seasoned group is essential.

Replacement inventory should be 10 per cent of equipment cost, or $20,000 on a $200,000 investment. At Beaverdale, between the railroad car and the face are 128 motors ranging in size from ¼ hp. to 750 hp., and they must be kept running continuously. Of these 103 are in the mine.

*Suspension of Trailing Cables*—One rule strictly enforced is the suspension of the cables on the cable-reel locomotives; otherwise the reels will be run over and when that happens a short circuit may occur just when air escaping from a punctured tire raises a cloud of coal dust—a fatal combination that should be avoided. The cost breakdown is: Material and supplies, $2,210; labor (544 shifts), $3,944; power, $235, and depreciation on equipment, $200; total, $6,589. If the recoverable coal is 90,000 tons on 1,200 ft. of butt headings with rooms off one side only, the per-ton cost is $0.073. Eighteen inches of bottom is lifted to a width of 9 ft. for about 2,000 ft. in each butt heading, or about 2,500 tons of rock.

Some operators, declared Harvey Younker, district representative, United Mine Workers, are taking short cuts which jeopardize

## Coming Meetings

- Operators' Association of Williamson Field: annual meeting, Jan. 23, Williamson, W. Va.
- Seventh International Heating and Ventilating Exposition: under auspices of American Society of Heating and Ventilating Engineers, Jan. 26-30, Philadelphia, Pa.
- American Institute of Electrical Engineers: winter convention, Jan. 26-30, Engineering Societies Building, New York City.
- American Mining Congress: annual, Feb. 6, Statler Hotel, Cleveland, Ohio.
- American Institute of Mining and Metallurgical Engineers: annual meeting, Feb. 9-12, Engineering Societies Building, New York City.
- American Society for Testing Materials: spring meeting, March 2-6, Cleveland, Ohio.
- American Mining Congress: coal convention and exposition, April 27-May 1. Music Hall, Cincinnati, Ohio.
- Mine Inspectors' Institute of America: annual convention, May 25-27, Lafayette Hotel, Lexington, Ky.

safety. Labor has lobbied for safety at Harrisburg, and the miners who have obtained much of what they sought are in honor bound to be active in promoting safety wherever it may be jeopardized by their wrongful actions. The union has worked to get the certificate law enacted; the operators quite generally opposed it; now that it is here, let the mine workers live in strict accordance with it. Mining is a highly specialized work, and special training is needed to perform that work safely, so the certificate law was essential, but responsibility goes with it, and union officials and workmen should recognize that fact. Safety meetings must be restricted to the inculcation of safety and safety alone and are not to be used for the purpose of raising other issues.

Safety is good for the investor, but still better for the miner, and he must approach it in that spirit. The miners are suspicious. Mr. Younker would not deny that they have had some reason for such suspicion, but both miners and operators must try to allay it and meet the issues in the right spirit. What is wanted is willing, not forced, cooperation. The miners have declared that their members on the safety committee must be 40 years of age and have 15 years of experience, accepting to the full their responsibility that the men they place on the committee will be men of seasoned judgment.

Discussing priorities, Richard Maize, State Coordinator of Mines, said that in calculating priorities, the quantity, not the cost, of purchases would be considered. More might be purchased in proportion to the quantity of coal produced annually, but no more per ton must be bought than sufficed in previous years.

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## Obituary

JAMES THOM BEARD, 86, associate editor (retired) of *Coal Age*, died at his home in Danbury, Conn., Dec. 26, as *Coal Age* was going to press. A sketch of his career will appear in our February issue.

GEORGE B. HADESTY, formerly general manager of the Philadelphia & Reading Coal & Iron Co., with offices at Pottsville, Pa., died Dec. 17 in that city. He resigned his post as operating head of the company's mining department in 1929. In November, 1933, he was Presidential appointee on the Northern West Virginia Subdivisional Bituminous Coal Code Authority.

D. C. CAMPBELL, 80, who pioneered in eastern Kentucky coal fields, died Nov. 30 at his home in Knoxville, Tenn. He opened Highcliff coal mines in Whitley County, and later, with the Bardo Coal Mining Co., operated mines in Harlan County.

EDWARD L. HAMPTON, 80, coal executive and business leader, died Nov. 27 at Nashville, Tenn., after a brief illness. In 1905, leaving the railway and telegraph field, he formed the Nunnelly Ridge Coal Co. Acquiring other mines later in Grundy County, Tennessee, he formed the Tennessee Consolidated Coal Co. and served as its president until his death. He also was vice president and a director of the Cumberland Portland Cement Co. and was a director of the Alabama By-Products Corporation.

ROBERT WILLIAMS JR., 68, superintendent of the Somerset mine of the Utah Fuel Co., Somerset, Colo., died Dec. 1 in a Salt Lake City hospital. He started with the Utah Fuel Co. at Castlegate at the age of 16. He became superintendent at Castlegate in 1910, being transferred to Somerset four years later as superintendent, retaining that post until last June.

JAMES WESTFIELD SR., 57, mine foreman at the Castlegate mine of the Utah Fuel Co., Castlegate, Utah, for the last eleven years, died Dec. 2 in a Salt Lake City hospital.

GEORGE SYMON, 58, superintendent at the mine of the Stephens Elkhorn Fuel Corporation, Manton, Ky., was killed in local explosion in the mine on Dec. 8.

### New Preparation Facilities

RED JACKET COAL CORPORATION, Coal Mountain, Wyoming County, W. Va.—Contract closed with Fairmont Machinery Co. for new preparation plant equipped with screens, crushing equipment and domestic-coal and refuse facilities to produce 1½-in. lump (loaded over a boom) and minus 1½-in. resultant. The plant will be preceded by a rotary dump, 500-ft.-long rope-and-button conveyor and 180-ft.-long belt conveyor with separate rock bin. Run-of-mine capacity will be 250 tons per hour.

WESTWOOD COLLIERY, INC., Tremont, Pa.—Contract closed with Wilmot Engineering Co. for one 7-ft. Wilmot Hydrotator to prepare 50 tons per hour of No. 4 buckwheat.


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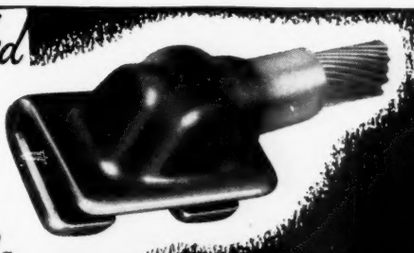

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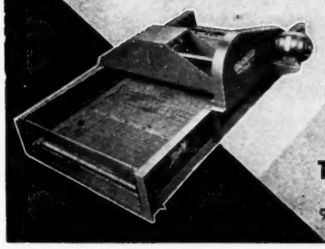

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## To Probe Solid Fuel Situation

The Senate at Washington early in the second week of December approved the Maloney resolution (S. Res. 189) extending the authority of Senator Maloney's special committee which investigated the gasoline shortage to expand its investigation to include solid fuels. Approval of the resolution gives the committee power to obtain information as desired on the development, production, distribution, utilization, transportation and handling of solid fuels with a view to determining the most effective means of assuring the nation's industries of an adequate supply.

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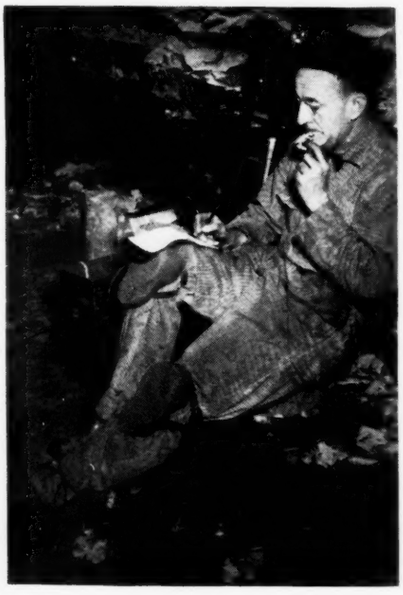
## Industrial Notes

JEFFREY MFG. CO., Columbus, Ohio, has appointed P. O. Emery as district manager at Harlan, Ky.

CHICAGO PNEUMATIC TOOL CO., New York City, has promoted Joseph A. Sullivan, assistant publicity manager, to advertising manager. Joining Chicago Pneumatic in 1928, he served until 1932 as head of the direct-mail division of the company's publicity department. From 1932 until 1935 he was with Sweet's Catalog Service division of the F. W. Dodge Corporation as copy chief, in the latter year rejoining Chicago Pneumatic as assistant publicity manager. E. R. Goss has been advanced to branch manager of the El Paso (Texas) branch office. He succeeds E. J. Coughlin, who was killed in an automobile accident on Oct. 14.

CHAIN BELT CO., Milwaukee, Wis., has appointed Dow & Co., Inc., 1820 Elmwood Ave., Buffalo, N. Y., as distributor of Rex con-



## Erratum

Our Associate Editor Jack Edwards indignantly advises that he does not eat chocolate bars underground but consumes peanut-brittle bars instead. At the same time he sends in this shot from a mine in Tennessee which shows neither kind of bar—but a cookie! We should have simply said that Jack eats—underground.

struction equipment in the Buffalo and Rochester area.

BUDA CO., Harvey, Ill., has appointed A. A. Gustafson as director of personnel and safety. A graduate mechanical engineer from Purdue University, he has had 15 years' experience with manufacturing concerns in the Chicago area.

POMONA PUMP CO., Pomona, Calif., announces that Walter E. Bisler, formerly sales engineer for the Combustion Engineering Co. in the Pittsburgh district and connected with the Heine Boiler Co. and Combustion Engineering Co. since 1920, has accepted the post of district sales manager for Pomona, with offices in the Grant Building, Pittsburgh, Pa.

WESTINGHOUSE ELECTRIC & MFG. CO., East Pittsburgh, Pa., has elected T. I. Phillips a vice president. He started with the company as a tool maker in 1915 and has been assistant to the president of the company since Feb. 14 of this year.

LAPLANT-CHOATE MFG. CO., INC., has added C. M. Daniel to its sales department to assist at the office in Cedar Rapids, Iowa. He has been sales promotion manager for the International Harvester Co. at its Terre Haute (Ind.) branch, and for several years prior to that was connected with the Davenport (Iowa) branches in the motor truck, industrial and farm equipment divisions.

JOHN A. ROEBLING'S SONS CO., Trenton, N. J., has announced the retirement of Raymond R. Newell as manager of its Cleveland (Ohio) branch on Dec. 1. He had been associated with the company for 39 years and had been in charge of the Cleveland organization since 1911. Eugene King, former assistant manager under Mr. Newell, has been appointed to the managership. Mr. King was first employed by the Roebling company in 1917.

LINK-BELT CO.'S EASTERN STOKER DIVISION will remove its sales office on Jan. 5 from Philadelphia to the Graybar Building, New York City. K. C. Ellsworth is in charge.

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## Coal-Mine Accident Fatality Rate Continues to Wane

Accidents at coal mines of the United States caused the deaths of 108 bituminous and 11 anthracite miners in October last, according to reports furnished the U. S. Bureau of Mines by State mine inspectors.

With a production of 49,800,000 net tons, the accident death rate among bituminous miners was 2.17 per million tons mined, compared with 2.22 in October, 1940.

The anthracite fatality rate from accidents in October last was 2.04, based on an output of 5,382,000 net tons, against 3.44 in the corresponding month of the preceding year.

For the two industries combined, the accident fatality rate in October last was 2.16, compared with 2.35 in the tenth month of the preceding year.

Fatalities during October last, by causes and states, as well as comparable rates for the first ten months of 1940 and 1941, are shown below:

UNITED STATES COAL-MINE FATALITIES IN OCTOBER, 1941, BY CAUSES AND STATES

| State | Underground: Falls of Roof | Falls of Face | Haulage | Gas or Dust Explosions | Explosives | Electricity | Machinery | Other Causes | Total Underground | Shaft | Open-cut | Surface | Grand Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alabama | .. | .. | .. | .. | .. | .. | .. | 1 | 1 | .. | .. | .. | 1 |
| Arkansas | .. | .. | .. | 2 | .. | .. | .. | .. | 2 | .. | .. | 1 | 3 |
| Colorado | 1 | 1 | 1 | .. | .. | .. | .. | .. | 3 | .. | .. | .. | 3 |
| Illinois | 2 | .. | 2 | .. | .. | .. | .. | .. | 4 | .. | .. | .. | 4 |
| Indiana | 1 | .. | .. | .. | .. | .. | .. | .. | 1 | .. | .. | .. | 1 |
| Iowa | 1 | .. | .. | .. | .. | .. | .. | .. | 1 | .. | .. | .. | 1 |
| Kansas | 1 | .. | .. | .. | .. | .. | .. | .. | 1 | .. | .. | .. | 1 |
| Kentucky | 7 | 3 | 5 | 15 | .. | .. | .. | .. | 30 | .. | .. | 2 | 32 |
| Maryland | 1 | .. | .. | .. | .. | .. | .. | .. | 1 | .. | .. | .. | 1 |
| Ohio | 2 | .. | 1 | .. | .. | .. | .. | .. | 3 | .. | .. | .. | 3 |
| Oklahoma | .. | .. | .. | 1 | .. | .. | .. | .. | 1 | .. | .. | .. | 1 |
| Penna. (bituminous) | 8 | ... | 4 | .. | .. | .. | .. | 1 | 13 | 3 | 1 | 1 | 18 |
| Tennessee | 1 | .. | 1 | .. | .. | 1 | .. | .. | 3 | .. | .. | .. | 3 |
| Utah | .. | .. | 1 | .. | .. | .. | .. | .. | 1 | .. | .. | .. | 1 |
| Virginia | 5 | .. | .. | .. | .. | .. | .. | .. | 5 | .. | .. | .. | 5 |
| West Virginia | 15 | 1 | 3 | .. | .. | 4 | 2 | .. | 25 | .. | .. | .. | 25 |
| Wyoming | .. | 1 | 1 | .. | .. | 1 | .. | 1 | 4 | .. | .. | 1 | 5 |
| Total bituminous | 45 | 6 | 19 | 18 | .. | 6 | 2 | 3 | 99 | 3 | 1 | 5 | 108 |
| Pennsylvania (anthracite) | 4 | .. | 2 | 2 | 1 | .. | .. | .. | 9 | .. | .. | 2 | 11 |
| Grand total | 49 | 6 | 21 | 20 | 1 | 6 | 2 | 3 | 108 | 3 | 1 | 7 | 119 |

DEATHS AND FATALITY RATES AT UNITED STATES COAL MINES, BY CAUSES*

January–October, 1940 and 1941

| Cause | Bituminous: Number Killed 1940 | 1941 | Killed per Million Tons 1940 | 1941 | Anthracite: Number Killed 1940 | 1941 | Killed per Million Tons 1940 | 1941 | Total: Number Killed 1940 | 1941 | Killed per Million Tons 1940 | 1941 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Underground: | | | | | | | | | | | | |
| Falls of roof and coal | 461 | 448 | 1.240 | 1.089 | 86 | 88 | 2.016 | 1.896 | 547 | 536 | 1.320 | 1.171 |
| Haulage | 171 | 150 | .460 | .364 | 35 | 23 | .820 | .496 | 206 | 173 | .497 | .378 |
| Gas or dust explosions: | | | | | | | | | | | | |
| Local | 12 | 17 | .032 | .041 | 3 | 8 | .070 | .172 | 15 | 25 | .036 | .055 |
| Major | 236 | 57 | .635 | .138 | .. | .. | ... | ... | 236 | 57 | .570 | .124 |
| Explosives | 22 | 19 | .059 | .046 | 8 | 13 | .187 | .280 | 30 | 32 | .072 | .070 |
| Electricity | 29 | 32 | .078 | .078 | 5 | 4 | .117 | .086 | 34 | 36 | .082 | .079 |
| Machinery | 23 | 24 | .062 | .058 | 2 | .. | .047 | .... | 25 | 24 | .061 | .052 |
| Shaft | 7 | 6 | .019 | .015 | 3 | 2 | .070 | .043 | 10 | 8 | .924 | .017 |
| Miscellaneous | 24 | 13 | .064 | .032 | 6 | 10 | .141 | .216 | 30 | 23 | .072 | .050 |
| Stripping or opencut | 11 | 15 | .029 | .036 | 2 | 3 | .047 | .065 | 13 | 18 | .031 | .939 |
| Surface | 36 | 39 | .097 | .095 | 6 | 13 | .141 | .280 | 42 | 52 | .101 | .113 |
| Grand total | 1,032 | 820 | 2.775 | 1.992 | 156 | 164 | 3.656 | 3.534 | 1,188 | 984 | 2.866 | 2.148 |

* All figures subject to revision.

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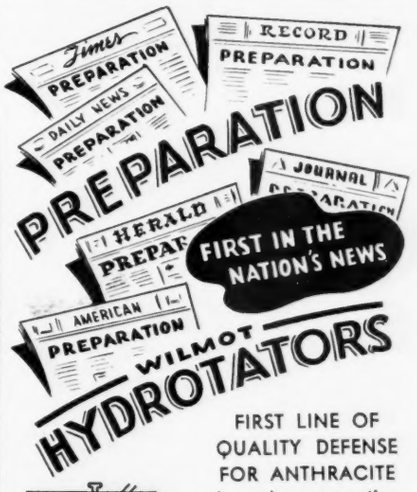


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A GREAT NAME IN THE COAL INDUSTRY
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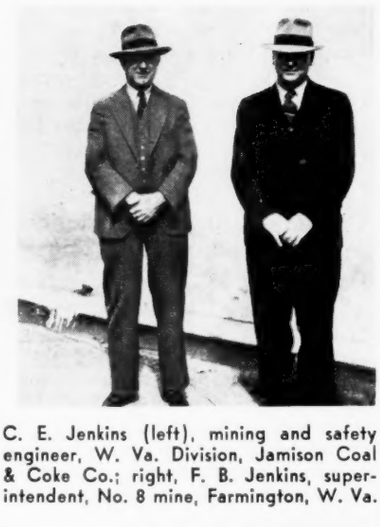
# COAL MEN ON THE JOB

C. Slusser, vice-president; H. G. Schmidt, general manager, Wheeling Township Coal Mining Co., Adena, Ohio, with W. F. Bloor, Victor Fleming and A. J. Ruffini, general superintendent.



C. E. Jenkins (left), mining and safety engineer, W. Va. Division, Jamison Coal & Coke Co.; right, F. B. Jenkins, superintendent, No. 8 mine, Farmington, W. Va.

Right, H. D. Jack, electrical engineer, with C. L. French, mining engineer, Wheeling Township Coal Mining Co., and I. A. Given, Coal Age.

C. D. Campbell, master mechanic; John H. Jones Pearce, superintendent; R. D. Thompson, p.a.; and Hubert Thorne, tipple foreman, Jones Collieries, Inc., Rachel, W. Va.

Paul W. F. J. Moran, preparation engineer, Pyramid Coal Corporation, Pinckneyville, Ill., thinks maybe it isn't as big as it looks.

Wayne Dinger, assistant master mechanic (left); Myles Anderson, master mechanic; and George Watson, tipple foreman, Elba Coal Co., Inc., Corsica, Pa.

Part of the second shift waiting for the man-trip, Cadogan mine.

James Thompson, superintendent (kneeling, left), with Harold Rogan, asst. foreman; Otis Sherry, Joy boss; Alonzo Sherry, asst. chief electrician; John Varholla, lampman; William Round, tipple foreman; Teddy Morris, asst. chief electrician; and William Lobough, chief clerk, Cadogan (Pa.) mine, Allegheny River Mining Co.

C. H. Stinard (standing, left), superintendent, Elba Coal Mining Co., Corsica, Pa., with part of the day and night pit forces.

Ralph Plyler, chief electrician, Mohican mine, Allegheny River Mining Co., Kittanning, Pa.

Joe Woodall, mine foreman, Mohican mine, Allegheny River Mining Co., Kittanning, Pa.

George Cain, J. D. Martin, T. F. Floyd, John Succurro, George Kolich and John Ellison, day-shift bosses, Jamison No. 8 mine, Jamison Coal & Coke Co., Farmington, W. Va., with John Cabot, foreman, and Wm. Reppert, safety inspector, West Virginia district.

George Schweinebraten, general mine foreman (left), with Bosses D. M. McKinley, J. C. Messinger, David Wilkins, Lee Cunningham, Bernard Swisher and William McOlvin, Dawson mine, Dawson Coal Co., Clarksburg, W. W. Va.

E. J. Weimer (standing, right), Federal division superintendent, Koppers Coal Co., Grant Town, W. Va., with C. E. Zuspan, chief electrician, Federal No. 3 mine (kneeling, left); E. D. Fortney, division electrician (kneeling, center); and S. H. Thatcher, K. Bosler, Ed Nash and L. L. Current, of the office and engineering staff.

R. T. Hutchinson, tipple foreman, Getty Coal Co., Hepzibah, W. Va.

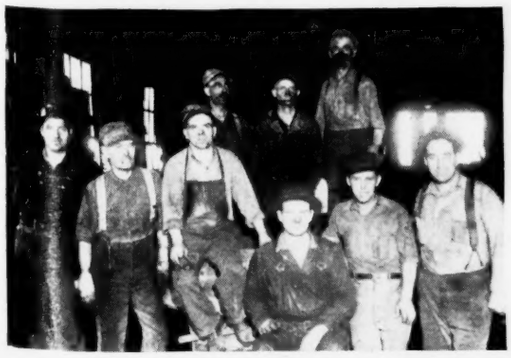
Lester Mahaney, tipple foreman; James Haley, master mechanic; and M. J. Hudak, supplyman, Jamison Coal & Coke Co. No. 8 mine, Farmington, W. Va.

J. W. Bartlett (left), chief clerk, with S. B. Kyle W. A. Layman and Arthur Coyne, of the Dawson Coal Co. office staff, Clarksburg, W. Va.

W. H. Bartlett and Fred Dagneaux, tipple foremen, Dawson Coal Co.

George Batcher, president; Joseph Batcher, vice president; and Tom Conway, chief electrician, Culmerville Coal Co., Culmerville, Pa.

Fred O. Johnson, superintendent (right), and H. L. Barrow, chief electrician (next), with shop staff, Rosedale Coal Co., Morgantown, W. Va.



V. L. Henry, warehouse clerk, Wheeling Township Coal Mining Co., Adena, Ohio.

Right end, A. R. Reppert, general manager, and H. R. Everson, chief electrician, Getty Coal Co., Hepzibah, W. Va.; left, H. S. Weatherholt, superintendent.

# BY EDITORS ON THE JOB

Floyd Wright gets things going at one session while A. D. Sisk, secretary-treasurer, sits ready to back him up.

Governor Keen Johnson promises more money for the Kentucky Department of Mines and Minerals.

Kenneth Snarr describes conveyor mining in thin coal.

F. J. Forsyth digs into power savings.

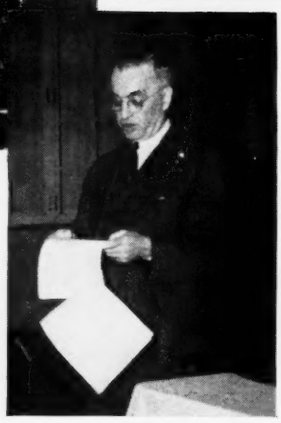
Dan Harrington talks on federal inspection

The banquet is greeted with smiles.

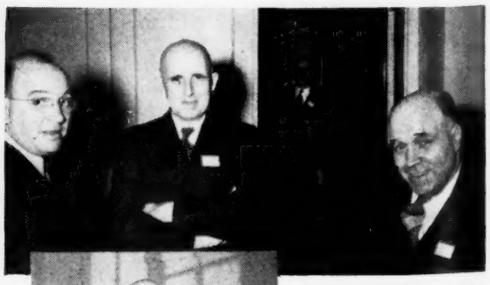
James H. Clagett, Utilities Elkhorn Coal Co., loses his shirt to the magician while C. B. Jackson, Black Diamond Coal Co., awaits his turn with apprehension.

L. E. Kelley surveys mechanical mining in the Elkhorn seam.

C. W. Owings discusses dust in mechanical mining.



A. U. Miller tells of the hazards of mechanical mining.



Louis W. Huber (left), Mine Safety Appliances Co., looks at the birdie with H. B. Husband, Consolidation Coal Co., and J. F. Bryson, Harlan Operators' Association.

Part of the gathering intent on the speaker's message.

V. C. McDonald discusses compensation costs.

# Safety in Mines, Power and Mechanical Operation Discussed by Kentucky Mining Institute

THE HAZARDS of coal dust, one of the five safety subjects dealt with in the eleven papers presented at the second annual meeting of the Kentucky Mining Institute, held at the Lafayette Hotel, Lexington, Ky., Dec. 5 and 6, stimulated the most discussion. Next in interest, as evidenced by questions, was power for mechanical mining, as well as mechanical mining itself. The three sessions were presided over by E. R. Price, general superintendent, Inland Steel Co., Wheelwright; Floyd Wright, superintendent, Southern Mining Co., Insull; and H. B. Husband, division manager, Consolidation Coal Co., Jenkins. Speakers at the annual banquet included Governor Keen Johnson, who promised a more generous appropriation for the Kentucky Department of Mines and Minerals. Resolutions favored passage of the Smith anti-strike bill, condemned smoking in both gaseous and non-gaseous mines and opposed proposed federalization of unemployment insurance.

Mechanical-mining work in the Elkhorn region was surveyed by L. E. Kelley, division engineer, Consolidation Coal Co., Jenkins, Ky., in a paper abstracted on p. 44 of this issue. Application of self-loading conveyors to thin-seam mining at the operations of the Williams Coal Co., Mannington, Ky., was described by Kenneth Snarr, superintendent. Mechanization was started with two small-capacity shaker conveyors and one chain unit late in 1937, said Mr. Snarr, and now the entire output of both properties is produced by shaker conveyors with self-loading heads, or duckbills, the original chain equipment being converted to gathering service. This chain equipment was installed with the idea of hand loading onto it, but it was found that it did not effect the savings that the self-loading shakers were providing. In the latter part of 1940 it was decided to try out the largest-capacity shaker equipment, which increased production per man approximately 5 tons.

"As a result of this experience, we are now replacing part of the small units with the larger ones, keeping only enough of the small ones for entry development. Our chain conveyors were of too small a capacity and too short. We naturally get a better cost with four shakers discharging to a common point than if we discharge with two. Too, there are several cost factors in favor of a much longer gathering conveyor than the 300-ft. limit of a chain conveyor. We therefore are replacing our chain gathering conveyors with 30-in.-wide belt conveyors with 1,000-ft. pulley centers extensible to 1,500 ft."

Both mines, in Hopkins County, are in the No. 6 seam overlaid by 40 to 250 ft. of overburden. Seam thickness varies from 36 to 50 in., with one mine in 48 in. and the other in 42. Grades as high as 21 percent have been encountered. In some sections, the seam is overlaid by as much as 36 in. of slate and bone coal. Where this condition exists, very close timbering is required.

Rooms are driven 40 ft. wide where practicable on 65-ft. centers to a depth of 300 ft. Shaker conveyors are operated in batteries of four in room work. A face crew for one shaker consists of a machine man, an operator, a helper and a fourth man engaged primarily in timbering. A car trimmer supervises loading of cars for a four-room unit. Three supplymen serve ten face crews. Performance varies rather widely, in accordance with variations in mining conditions. However, "under favorable conditions we have loaded as high as 178 tons in the new mine where the seam height is 42 in.," this figure applying to the output of one four-man face crew.

What becomes of 3.2 kw.-hr., or 65 per cent, of the 5 kw.-hr. per ton used in the West Virginia-Kentucky area, was the question posed by F. J. Forsyth, resident engineer, West Virginia Engineering Co., Pikeville, Ky. Cutting coal, said Mr. Forsyth, requires 0.6 kw.-hr., with the haul to the tipple taking 1.2 kw.-hr. The 3.2 remainder therefore is used in preparation, ventilation,

### Institute Officers

Lloyd J. Speed, president, Black Star Coal Corporation, Louisville Ky., was elected president of the Kentucky Mining Institute at the conclusion of its Dec. 5 and 6 meeting. Mr. Speed succeeds E. R. Price, general superintendent, Inland Steel Corporation, Wheelwright, Ky. Other officers and directors were chosen as follows:

Vice Presidents — Floyd Wright, superintendent, Southern Mining Co.; Paul Jones, mining engineer; and C. B. Jackson, general superintendent, Blue Diamond Coal Co.

Secretary-Treasurer—A. D. Sisk, Big Sandy-Elkhorn Coal Operators' Association.

Directors—L. C. Skeen, Eastern Coal Corporation; H. B. Husband, Consolidation Coal Co.; Harry LaViers, South-East Coal Co.; P. A. Grady, Carrs Fork Coal Co.; F. M. Medaris, Harvey Coal Corporation; R. E. Estil, United States Coal & Coke Co.; L. P. Johnson, Crummies Creek Coal Co.; B. W. Whitfield Jr., Bell Coal Co.; George M. Humble, Stearns Coal & Lumber Co.; Bradley Sparks, Luzerne-Graham Mining Corporation; Brent Hart, Hart Coal Corporation; C. S. Crouse, University of Kentucky; G. M. Patterson, Chief, Kentucky Department of Mines and Minerals; O. W. Evans, Norfolk & Western Ry. mining department; and Mr. Price.

Lloyd J. Speed, new institute president.

F. R. Price, retiring institute president.

New officials and directors of the institute pose for the Coal Age camera.

drainage, substation and transformer losses, repair work and town supply. Discussing possible savings in each classification, Mr. Forsyth concluded that, although the average is 5 kw.-hr., additional tonnage beyond the normal output will require no more than 2.5 kw.-hr. per ton.

"Hazards Introduced by Mechanized Mining and Suggestions for Their Elimination," by A. U. Miller, district engineer, U. S. Bureau of Mines, Mt. Hope, W. Va., led off the list of addresses devoted to safety, compensation and vocational training. V. C. McDonald, vice president, Bituminous Casualty Corporation, Louisville, Ky., analyzed compensation costs in coal mining, while vocational training opportunities available in the mining districts were surveyed by Carson Moore, coordinator, Mayo State Vocational School, Paintsville, Ky. Priorities problems in coal mining were discussed by W. R. Burroughs, district manager, Office of Production Management, Cincinnati, Ohio.

Pointing out that development of the proper safety consciousness is influenced by mine ownership, management, education, discipline and supervision, cooperation, records and statistics, and protective equipment, H. M. Gallaher, superintendent, Harvey Coal Corporation, Harveyton, Ky., analyzed the part each plays in the final result. "If safety consciousness is acquired and maintained," Mr. Gallaher declared, "it is the firm belief that the results which are certain to follow will be reflected in the reduction of injuries."

### How to Prevent Bumps

Using drawings to illustrate his points, J. F. Bryson, safety director, Harlan County Coal Operators' Association, Harlan, Ky., described how for six years bumps in a Harlan mine with cover running as thick as 2,100 ft. had been eliminated by establishing long faces and building rock-packed cribs on 20-ft. centers each way as mining progressed. The bumps usually occur where the cover is more than 1,600 ft. One which happened a month ago was due to the foreman departing from the system established in 1935.

Federal mine inspection objectives and methods was the subject of an address by Dan Harrington, Chief, Health and Safety Branch, U. S. Bureau of Mines, Washington, D. C., while coal-dust hazards in mechanical mines and remedial suggestions were detailed by C. W. Owings, Bureau mining engineer, of College Park, Md. "Dust can be controlled adequately under most conditions by applying enough water," said Mr. Owings, who conceded, however, that it had its objections from the standpoint of blinding of fine-coal screens. Use of wetting agents was included in Mr. Owings' comprehensive survey of the subject. Results include dust reductions of 50 to 60 per cent by the use of water thus made wetter.

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## Six-Day Week for Peabody

Seven Peabody Coal Co. mines in Springfield and Taylorville, Ill., were to begin operating on a six-day work week on Dec. 15, according to J. W. Starks, divisional superintendent. The change from a five-day week was expected to give employment to more than 200 additional men, said Mr. Starks.

# Ebensburg Welcomes Its Annual Institute To Consider Management and Training

MANAGEMENT problems involved in mechanization, resultful personnel training, shaking conveyors with automatic loading heads, and government priorities were discussed at the annual institute and banquet of the Tenth Bituminous District Coal Miners' Institute, held Dec. 13 at Ebensburg, Pa., at which Ernest Yannsens presided.

This district had better safety records than it has today, declared William Lamont, State Mine Inspector, so long as the local chapters of the Joseph A. Holmes Safety Association were in existence. They served an extremely useful purpose and should be revived. Success in modernization demands foresight, asserted J. W. Woomer, general manager, Warner Collieries Co. First of all must come a plant appraisal to determine how many units will be needed for the several cycles to be kept running, and then provision should be made so that a supply machine will be available at the working face in 15 or 20 minutes should any unit fail. To this must be added a personnel appraisal of the men needed and available. It is important that labor should be trained, and that cannot be done effectually by the mine staff.

Just how to train men for best results was discussed by D. C. Jones, supervisor, Mine Extension Course, Pennsylvania State College, an organization that was the first to provide mining industrial courses. Proper training should be afforded to apprentice miners, to shotfirers and to those who have to handle equipment. Once classes are started, their continuation is easy; the necessary "red tape" is in the commencement of operations. The State, through the State Department of Public Instruction, provides the money, and it is natural and right that it should not commit itself until it is convinced that an interest be manifested in the schools. Real interest has been evinced. A pit committee had called on a superintendent requesting that classes be started. The textbooks cost the student only $8 for three years' instruction. Education should not be grounded on the questions likely to be asked by the State examiner but should seek the higher goal of preparing the aspirant for the work he will have to perform.

Motion pictures with script were shown by R. E. Rankin, Goodman Manufacturing Co., and R. M. Maize, Secretary of Mines, urged economy in the use of material, maintenance of equipment in such condition that it will not deteriorate, collection of scrap, maintenance of order at the mines and control of explosives so as to keep them in proper hands.

At the banquet, A. J. Grady, a Pennsylvania R.R. official, declared that regulations as to the use of goggles had been made compulsory by railroads and that the unions had approved such regulations, which were more essential for the workman's happiness than for the welfare of the company. Railroad workmen showed no tolerance for the unsafe employee because their lives depended on safety; that is why no one is more safe than when he is on the railroad, and if miners show a similar sense of their dependence on each other, the accident rate in coal mines will shrink as it has in the railroad industry.

COAL AGE was founded in 1911 by the Hill Publishing Co. In 1915 *Colliery Engineer*, with which *Mines and Minerals* previously had been consolidated, was absorbed by COAL AGE.

When, in 1917, the Hill Publishing Co. and the McGraw Publishing Co. were consolidated to form the present McGraw-Hill Publishing Co., COAL AGE became a member of this larger publishing enterprise. On July 1, 1927, the journal was changed from a weekly to a monthly.

During 30 years the editorship has been held successively by Floyd W. Parsons, R. Dawson Hall, C. E. Lesher, John M. Carmody and Sydney A. Hale. The editorial staff of COAL AGE consists of: Sydney A. Hale, R. Dawson Hall, Walter M. Dake, Louis C. McCarthy, Ivan A. Given, J. H. Edwards, Charles H. Lambur Jr. and Fred W. Richart.

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## Probe of River Coal Prices May Be Asked by Harr

A petition looking toward a complete reexamination of the minimum prices fixed for river-borne coal may be filed with the Bituminous Coal Division, said Luther Harr, Bituminous Coal Consumers' Counsel, in his annual report to Congress, made public Dec. 19. Dr. Harr said that general dissatisfaction, particularly in the Midwestern States, has existed as a result of the Division's policy of fixing the mine price of coal to be shipped by river higher than that of the same coal when shipped by rail.

The report goes on to state: "In the event the investigation reveals that present regulations and minimum price relationships are burdensome to consumers of river-borne coal, this office will seek affirmative relief in behalf of those consumers whose interests are adversely affected." The report covers the activities of the Office of the Bituminous Coal Consumers' Counsel from July 1, 1940, to Oct. 1, 1941.

In an announcement issued Dec. 12, the Consumers' Counsel urged all consumers to consider the recommendations for purchase and storage of solid fuels made by Secretary Ickes to all federal agencies. The Secretary, as Solid Fuels Coordinator, asked information as to solid-fuel requirements for the government through 1942, to facilitate methods to assure adequate supplies through the war emergency.

"Such careful planning as Secretary Ickes considers to meet government requirements," said Dr. Harr, "applies equally to the requirements of all private consumers. This war is going to be fought from the bottom up. The littlest fellow among us is going to be called upon for his proportionate share

in the national effort. He, too, must plan ahead.

"At this time—due to the 'Buy Coal Now' campaign of this office through the summer months and other factors—this country has above ground an unprecedented supply of bituminous coal and, so far, the transportation systems have been able to move it. Increased production for the Victory Program, however, is going to require an unpredictable amount of energy for the factory wheels and assembly lines. New transportation problems also will arise with production centers developing in new neighborhoods. New routings and changes in direction of fuel shipment are certain to come.

"This will mean national planning, as Secretary Ickes has recognized. It also will require planning on the part of bituminous coal consumers, large and small, to see that they secure fuel essential to their needs for their part in the national war program. The Office of the Bituminous Coal Consumers' Counsel stands ready to cooperate with such consumers to meet the new problems as they arise."

In recommending that all government agencies which use solid fuels plan their fuel purchases to provide a comparatively large supply for storage purposes, in view of war-time conditions, Secretary Ickes said: "The planning of an adequate supply of solid fuels is a vital step toward meeting the responsibilities of our war efforts to which President Roosevelt pointed in his first speech to the nation after the opening of the conflict with Japan. We must never forget that solid fuels—particularly bituminous coal—is one of the necessary elements in the production of steel, chemicals, explosives and other raw materials we must have abundantly to win this war."

The Bituminous Coal Division has issued an order exempting coal produced by five Virginia mines from regulation under the Coal Act because it was found not to be bituminous within the meaning of the act, as follows: Anthracite Coal & Briquetting Co., Inc., Pulaski, whose exemption covers coals produced from the Langhorne seam; Frank Thomas Coal Corporation, Merrimac; Great Valley Anthracite Coal Corporation, McCoy; Superior Anthracite Mines, Inc., McCoy; Hard Coal Mines, Inc., Christiansburg, and the Otey Mines, Blacksburg.

A temporary order has been issued authorizing two Illinois producers to charge lower minimum delivered prices for river-shipped coal to certain Chicago dealers while final decision is pending on a request for permanent lower prices for river shipments. The order also requires producers and dealers to file information with the Division to provide means of ascertaining whether savings due to cheaper transportation charges resulting from shipping coal by river instead of by rail are passed along to the ultimate consumers.

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## Trade Literature

ADVICE ON PATENTS—Allis-Chalmers Mfg. Co., Milwaukee, Wis. Booklet entitled "Patent Background for Engineers" is designed primarily for engineers and executives who deal with inventions. The articles cover such subjects as basic patent considerations, importance of the drawing, specifications and claims in evaluation of patents; patent fallacies, protection of new inventions, safeguarding of inventors' rights, importance of determining the original inventor, joint inventorship, whether or not to shroud an invention in secrecy, public or experimental uses of inventions, effect on product sales of an invention prior to patenting, trend and development of American patent law, what compulsory patent licensing would mean, streamlining patent prosecution, and trademarks.

BELTING—B. F. Goodrich Co., Akron, Ohio. Catalog Section 2186, on open-end V-belting, lists the standard sizes in which the belting is available, limitations, minimum recommended pulley diameters, rules for applications, and fasteners and tools used in the installation of an open-end V-belt drive.

CENTRIFUGAL PUMPS—A. R. Wilfley & Sons, Inc., Denver, Colo. Bulletin E-4320 describes Wilfley plastic-lined acid pumps, using machinable alloys for wetted pump parts and with the stuffing box eliminated with a patented impeller which is said to prevent leakage while running.

ELECTRONIC CONTROL SYSTEM — General Electric Co., Schenectady, N. Y. Publication GED-972A gives the complete story on Thy-mo-trol, the new G.E. electronic control system for operation of d.c. motors from a.c. lines. Containing halftones, a simplified chart and diagrams, the publication tells how the Thy-mo-trol system not only provides stepless, wide-range speed control but also performs the functions of starting, accelerating, protecting and stopping d.c. motors.


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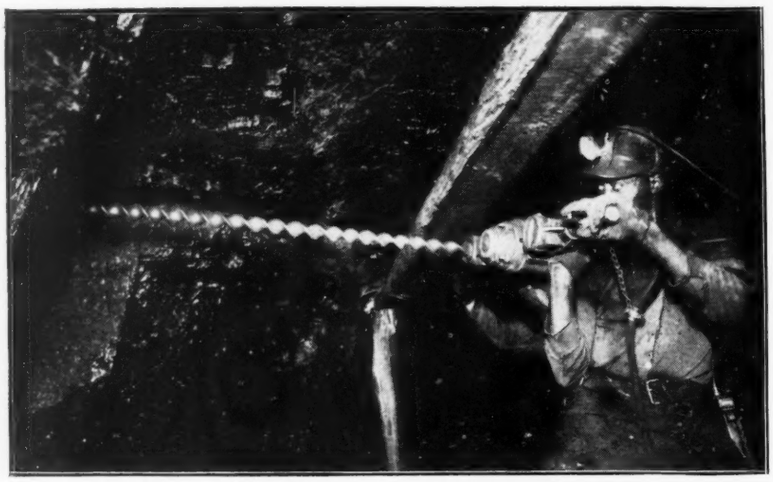
MANUFACTURERS OF TURBINES STEAM HYDRAULIC PUMPS CENTRIFUGAL PROPELLER ROTARY DISPLACEMENT MOTOR-MOUNTED MIXED FLOW CLOGLESS SELF PRIMING CENTRIFUGAL BLOWERS and COMPRESSORS GEARS WORM HELICAL and FLEXIBLE COUPLINGS

# WORLD'S FASTEST ELECTRIC COAL DRILL



## DESIGN EMBODIES BEST FEATURES SUGGESTED BY COAL MINE MEN

### Powerful Motor Secret of Speed

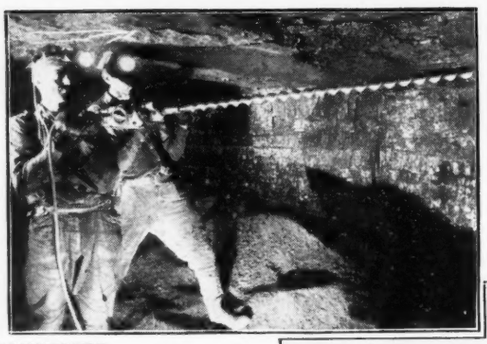
NEW YORK — Aptly named the "Whippet", CP No. 571 Hand-Held Electric Coal Drill is faster, lighter and safer than any electric coal drill previously available.

Coal mine men, above and below ground, helped to design the "Whippet". A full scale, wooden model of the proposed drill was taken to a number of leading mines. Practical men were asked the features they would like to see in a hand-held drill. Resulting suggestions as to shape, weight, balance, etc., were embodied in a design that has proved to be the fastest, lightest—and safest—hand-held coal drill.

CHICAGO PNEUMATIC TOOL COMPANY

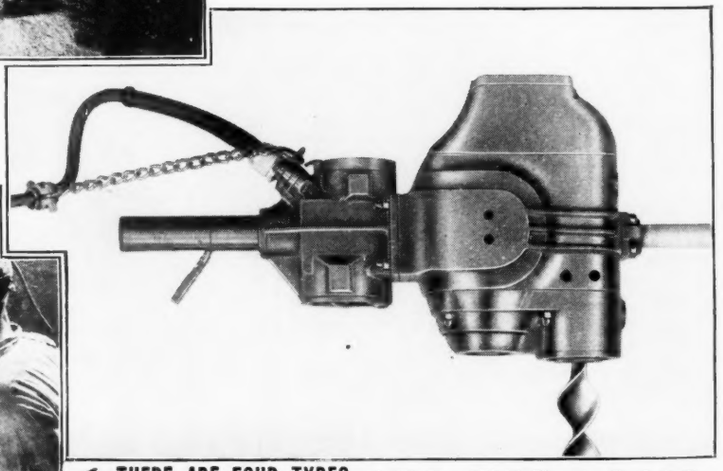
General Offices: 6 E. 44th St., New York, N. Y.

↑ **CLOSE QUARTER DRILLING** Removal of dead handle permits parallel drilling within two inches of either top or bottom. In the softer seams, one man can easily handle the "Whippet" without fatigue.



**6 FOOT HOLES IN LESS THAN A MINUTE →** is the performance of the "Whippet" in Pocahontas seam. A newly developed, compound-wound DC motor provides exceptional power; the CP safety clutch permits speeds in excess of other drills.

**THIS PERMISSIBLE TYPE "WHIPPET"** weighs only 43 pounds; the open type, 40 pounds. Note that the adjustable safety clutch, auger chuck, motor and gears are completely enclosed in streamlined housings. The CP "Whippet" Electric Coal Drill is as safe as it is speedy. →



**← THERE ARE FOUR TYPES** of CP Hand-Held Electric Coal Drills. Here is the No. 572 Permissible with safety clutch, bottom drilling in Pittsburgh seam. Its light weight, speed and safety cut drilling costs. Furnished for 250-volt D.C., or 3-phase, 60-cycle, 220-volt A.C. operation.

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**ALSO: Air Compressors, Pneumatic Tools, Electric Tools, Rock Drills, Hydraulic Aviation Accessories, Diesel Engines**

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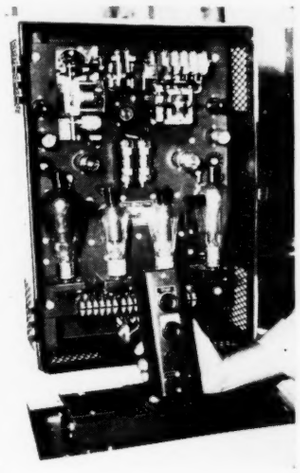
HAND-HELD
ELECTRIC AND PNEUMATIC TOOLS FOR MAINTENANCE AND REPAIR

# WHAT'S NEW IN COAL-MINING EQUIPMENT

### ELECTRONIC CONTROL, MINE PHONE CABLE

As an outgrowth of its thyratron speed control for d.c. motors, General Electric Co., Schenectady, N. Y., offers a new electronic control system — called Thy-mo-trol to provide simple, stepless control of d.c. motors from a.c. lines wherever a wide speed range is needed. Normally consisting of three separate units —a small control station, a transformer, and a thyratron tube panel—the control provides in



one equipment the means for electronically starting, stopping, accelerating and regulating the speed of a motor. Standard units will cover motor sizes up to 5 hp., 230 volts.

The Thy-mo-trol system provides wide-range speed control without the use of motor-generator sets or gear and pulley arrangements. A single-dial control, mounted in a heavy-duty push-button station, covers the complete speed range of the motor, both above and below basic speed. The motor is automatically accelerated to preset speed quickly and smoothly without excessive current peaks. The same single dial can also be used to change speed to any desired value during operation.

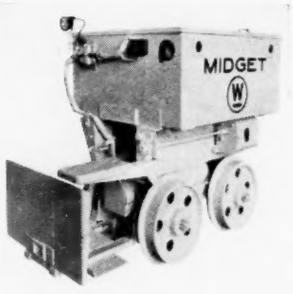
A new mine telephone cable said to have the mechanical and electrical strength of large cables but a diameter of slightly over ¼ in. is announced by G. E. This twisted-pair No. 14 A.w.g. solid cable is designed for mine telephone service where induced currents and cross talk must be reduced to the minimum.

Claims made for the cable are: Versatol insulation makes it heat- and moisture-resistant; a tellurium-compounded rubber jacket insures protection against mine waters and soil acids; breakage is reduced by use of hard-drawn tinned-copper conductors, with one conductor ribbed for easy identification; the new cable can be run through water without ill effects, can be hung on pegs, or buried in the ground; its light weight (80 lb. per 1,000 ft.) makes it easy to transport to any desired location.

•

### MINE LOCOMOTIVE

For use in coal, metal and nonmetallic mines, a new storage-battery tramming locomotive is offered by Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. Known as the Midget and weighing only 1.5 tons, this unit is operated by a 5-hp. 40-volt d.c.




traction motor. Continuous motor rating is 770 r.p.m., 55 amp., 40 volts, with a gear ratio of $11\frac{2}{3}$:1. Chassis is of heavy one-piece cast-steel construction. Frame is spring suspended for cushioning of rock shocks.

Power is transmitted through torsion-ring coupling to worms driving worm gears. The rated drawbar pull is 400 lb. A three-position controller is arranged for series-parallel control of the motor fields in either direction.

•

### POWER SAWS

Henry Disston & Sons, Inc., Philadelphia, Pa., offers one- and two-man power chain saws operated either by electricity or air. According to the manufacturer, they are built with high-strength aluminum castings, precision helical gears and precision ball bearings; cutting chain and guide rail made of high-quality alloy steel—hardened, tempered, ground and polished where required. An automatic tensioning device is said to keep chain at optimum tension, assuring fast, straight cutting.

The motors are rugged heavy-duty units: the electric motor rated at 1⅓ hp. (input up to 5,000 watts), the rotary air motor rated at 1½ hp. (90 cu.ft. of air at 90 lb. pressure). The electric universal motors, a.c. and d.c., are for 110- or 220-volt 60-cycle service.

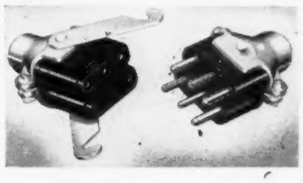
Savings claimed are: In lumber and power, because the scientifically designed cutting chain cuts with a narrow kerf, causing little sawdust; in cutting time, an 8x12-in. pine beam being cut to a straight edge in 15 seconds; in sharpening time, since with the Disston precision grinder a semi-skilled workman can resharpen a chain saw in 15 minutes; and in long life.

The one-man model (see illustration) is available in 14-in. capacity, weighing 35 lb. and 42 in. in over-all length; also 16-in., weighing 36 lb. and 44 in. over all. The two-man model comes in 20-in. capacity, weighing 41 lb. and 48 in. long over all; also 24-in., weighing 42 lb. and 52 in. over all.

•

### TRAILING CABLE PLUG, GROUND CLAMP

Ohio Brass Co., Mansfield, Ohio, has developed a new 6-conductor plug for effecting trailing-cable connections. Designed especially for making connections to reversible motors, the terminals of the new unit accommodate No. 6 and smaller sizes of wire. As its name implies, the new Mechano-Plug is a mechanically assembled and installed plug. Eliminating vulcanizing or unsightly and dangerous cable splices, it can be installed in the field with the simplest tools.

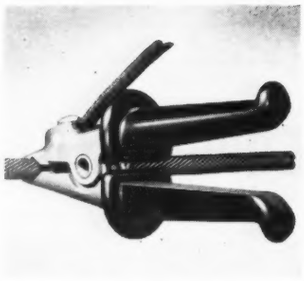


Male and female plug bodies cannot be connected improperly because the non-corrosive spring bronze terminal plugs and sockets are so arranged as to prevent improper polarity in making connections. A color key simplifies proper polarity hook-up at the time of installation.

The plug body is of rubber, providing ample insulation against electric shock. Moisture- and dust-proof joints insure a positive, leakproof electrical connection. The 6-conductor Mechano-Plug is designed for currents of 80 amp., voltages from 250 to 600 d.c.

Ohio Brass also announces the development of a new plier-type ground clamp for effecting ground or return-circuit connections to rail bond cable or rail. Known as the Junior plier-type ground clamp, it has ample capacity to handle ground connections for drills and similar equipment.

Heavy bronze clamping jaws actuated by a strong steel spring provide positive mechanical and electrical connection facilities.



Rubber-covered handles protect the operator. Its solderless terminal accommodates No. 4 and smaller sizes of wire. The clamping jaw will fit No. 1 to 4/0 cable suitable for currents of 80 amp. and voltage from 250 to 600 d.c.

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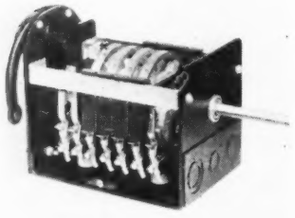
### DRUM CONTROLLERS

A new line of drum controllers for small cranes and hoists is announced by Cutler-Hammer, Inc., Milwaukee, Wis. Small and compact in size, these new drums have several interesting features.

A rope operating lever embodying a new equalized torque principle, it is said entirely eliminates cumbersome sheave wheel, rope guard and external return spring, and provides smooth, easy operation even when the rope is pulled at an angle.



A new anti-plug feature increases drum life by making it impossible to whip drum from full forward to full reverse position. Drum can be reversed quickly, but yet a definite time delay is required in the off position.

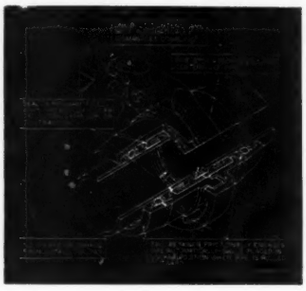
These new drums are available in self-centering rope lever, self-centering and non-self-centering radial lever types, for four or six speeds.

•

### BALL GRIP COUPLINGS

A new type ball grip coupling fully tested for high pressures as well as vacuum, permitting flexibility at the joint and simplicity in making connection or disconnecting plain-end pipe has been introduced by Hanlon-Waters, Inc., Tulsa, Okla. These H-W ball grip couplings are said to assure faster installation, with resulting savings for either permanent or temporary pipe lines. Provision also has been made for expansion, contraction and angular deflection of 7 deg. at each end of coupling.

These units consist of a housing with ball retainer and a flexible sealing gasket. The ball retainer, or cage, carries a plurality of balls and a frictionally engaging means so that after the pipe is inserted and pulled outward the balls are brought into contact with the tapered surface, causing a positive lock and preventing the pipe from being withdrawn. One bolt tightens connection and the same bolt reversed automatically allows the coupling to be dismantled. No special tools are required, a small wrench being all that is necessary to take the coupling off the pipe, apply tension and at the same time rotate the coupling. All couplings are provided with a pipe stop to assure pipe being centered in coupling. The coupling further permits rotating of valves on pipe axis without disconnecting.



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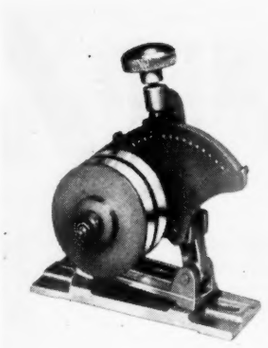
### VARIABLE SPEED CONTROL

A new V-belt variable speed transmission known as the JFS-CUB is offered by Standard Transmission Equipment Co., Los Angeles, Calif. It is especially designed for all "A"-section V-belt applications and for speed ranges up to 3.3:1. Smooth-sided pulleys are used rather than the interlocking type.

Among advantages claimed are: patented positive belt-alignment feature making possible mounting the CUB in any and every position without impairing function or throwing belts out of alignment; machined and balanced cast-iron construction; forced lubrication of the special bronze bearings on which the pulleys rotate; free-end pulley spindle to permit easy installation of belts; both pulleys on one side of pivotal mechanism, which permits motor pulley and driven pulleys to be almost directly in line with each other, etc.



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### SERVICE PIPE

To relieve the shortage of galvanized pipe and copper tubing, Hill, Hubbell & Co., Cleveland, Ohio, announces that the H-H process is now being made available in shatterproof steel service pipe. H-H exterior factory-processed coatings are available in sizes from $\frac{3}{4}$ to $1\frac{1}{2}$ in. with special interior cement linings. Regular water works enamel linings and coatings are available in sizes from 2 in. up.

•

### LOADER

Athey Truss Wheel Co., Chicago, offers the new Model 8 Mobiloader, powered by the "Caterpillar" D8 tractor. Companion model is the W4 Mobiloader, which is used on a wide variety of loading operations.

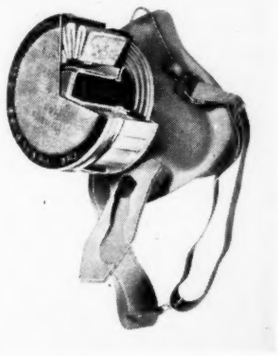
The Model 8, which is sold by Caterpillar dealers, digs at the front and dumps overhead to the rear, employing the same principle as the W4. With bucket capacities ranging from 2.7 to $9\frac{1}{2}$ cu.yd., depending upon the type of materials to be handled, the Model 8 loads earth, ore, sand, coal, clay, gravel, stone and many other materials.

•

### RESPIRATOR

A new respirator which is said to afford maximum protection against the inhalation of pneumoconiosis-producing and nuisance dusts is offered by the De-Vilbiss Co., Toledo, Ohio. Approved by the U. S. Bureau of Mines, this "M S D" respirator is described as compact, light, easy to breathe through, comfortable to wear, and easy to clean and maintain.

In the new unit, according to the company, a scientifically and compactly designed cartridge measuring only $2\frac{7}{8} \times 1\frac{1}{2}$ in. and weighing but 1 oz. provides more than 41 sq.in. of breathing and filtering area. Ingenious multi-vane construction allows every inch of this filter to be used efficiently. The filter is cleaned by blowing accumulated dust from vanes with an air-dusting gun or nozzle, thus maintaining peak performance and requiring less frequent replacement. The new respirator is designed to fit, closely and without leakage, the contour of practically any face.



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### CUTTING TOOLS

A new standard series of Kennametal tools in large turning and facing styles for heavy machining is offered by the McKenna Metals Co., Latrobe, Pa. The position of the tip in the shank is said to permit greater thickness of steel under the cutting point of the tip, permit the top surface or chip breaker to be ground without the necessity of grinding away steel, and during the life of the tool the height of the cutting point is retained rather than being lowered each time the tool is ground. Tools of this design are available in all turning and facing styles and in all shank sizes 1 in. and larger.

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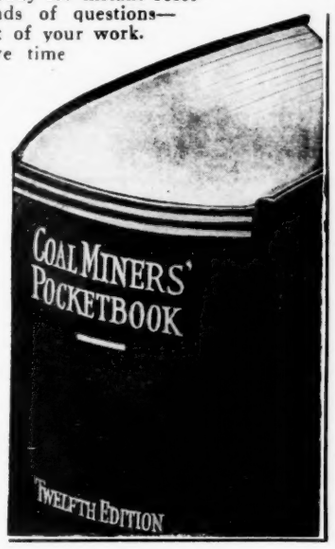


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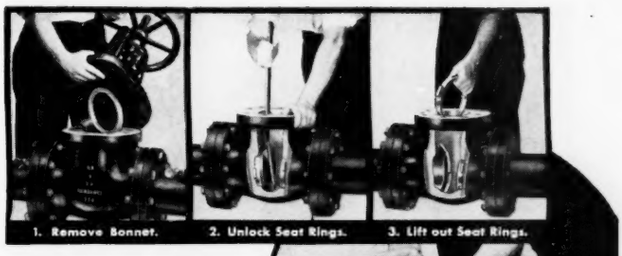


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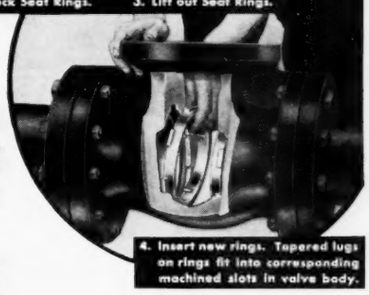


*Fig. 0304*
*150 lbs. pressure*

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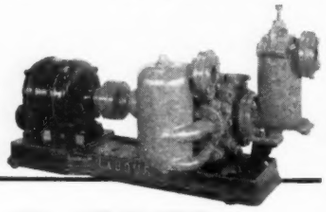

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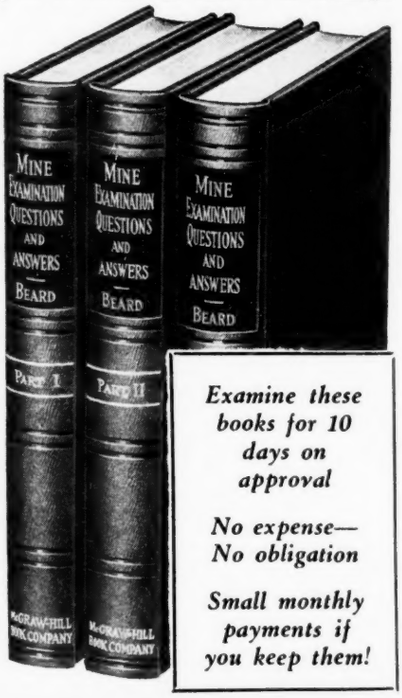


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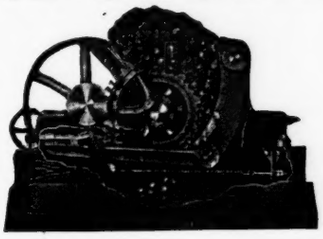

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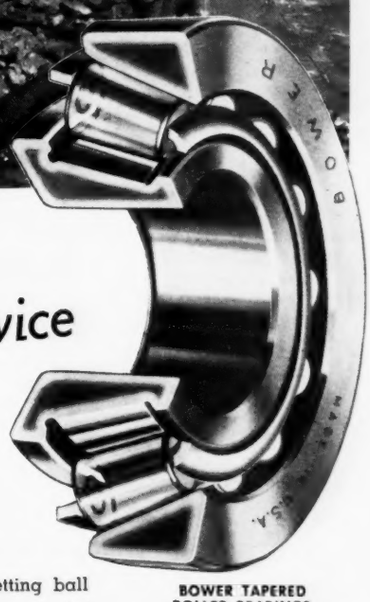

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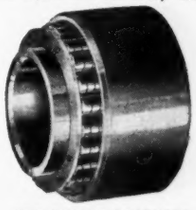

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•

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*Your* problems of mine management, production and maintenance—business or individual—are duplicated with *other* readers BUT—

Still *OTHER* readers can provide the solution of your problem if they *know what it is!*

Tell them! Here! Through classified advertising in the Searchlight Section of Coal Age—*your* business paper and *theirs.*

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**In Good Condition**

**H. W. YOUNG**

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**Capacity over million yards per month. For rent, sale or contract. Part or all.**

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**A VIBRATING SCREEN**

Produces six sizes of coal, complete with motor. Price $500.00. Cost $1800.00. Location Southwestern Pennsylvania.

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1—30x30 or 2 smaller roll type **Coal Crushers.**
1—200 to 300 **KW M.G. Set.**
1—50 to 60 Ton **Locomotive.**
20 Ton or Larger **Locomotive Crane.**
1—**Rotary Dryer** 5x60 or equal.

**R. C. STANHOPE, INC.**
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COAL REFINING COMPANIES Here is an experienced refining man, holding 1st Class Refine Foreman's Certificates for 5 states, and can take charge of your operations, as Superintendent or Safety Engineer. He has 30 years experience in all Phases of Refining mostly Gas and Dusty Refines. Present employed as Safety Engineer, but desires a change. PW-602, Coal Age, 330 W. 42nd St., New York, N. Y.

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**Strip Coal Land**

For Lease: 2449 acres No. 5 seam in Warrick County, Indiana, 1223 acres of fee land. The New York Central Railway runs through 1001 acres and remainder of land is in trucking distance of the railroad, or will lease 100 acres, light overburden on railroad with 400 foot switch. In reply state name of operating company. Address J. R. Wasson, Boonville, Indiana.

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For detailed information or an appointment to inspect this property, write

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**200-B Bucyrus 6 years old. 75 ft. Boom, 60 ft. Dipper stick, 6 yd. Dipper Steam Shovel, mounted on propelling caterpillars. In excellent condition.**

**SHOVEL & DRAGLINE:**
4 yd. 120 B Bucyrus Electric Shovel & 100 ft. boom Dragline

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**2 Monighan 3W Walker, 90 ft. boom. Ready for Service.**

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(7) Steam 66 ft., 300 ft., 600, 1000 & 1940 ft.
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2½ ton Whitcomb 24 ga. New Batteries
2—4 ton G.E. 30 in. ga.
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4—5 ton G.E. 36 in. ga.
3—7 ton Goodman 36 ga. Battery & Trolley
8—6 ton Baldwin Westgh. 42 ga. & 36 ga.

**TROLLEY LOCOMOTIVES:**
2½ ton Westinghouse 24 ga.
4—6 ton & 3—5 ton Goodman 36 ga.
3—6 ton Goodman 30 ga.
4—6 ton Goodman 42 ga.
5—6 ton Westinghouse 42 ga.
2—8 ton Goodman 36 ga.
10 ton Goodman 42 ga. & 13 ton Jeffrey

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9 Tyler Hummer 3x6, 4x5, 4x8 & 4x10
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120—4 ton 42 ga. S.D. Mine Cars
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25 ton Browning 50' Boom Loco. Crane
7 Conway 20A, 30A, 50A, 60 & 75 Muckers

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Complete Mines—M.G. Sets, Locomotives, Compressors, Conveyors, Cranes, Crushers & Rotary Converters. Also Rails, Screens, Pumps, Cars, Mine Loaders & Mining Machines.

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**AC and DC included.**

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STORAGE BATTERY

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1¼ to 10 Ton—18" to 56" Track Gauge
**GREENSBURG MACHINE CO.**
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## LOCOMOTIVE

6 ton Milwaukee—Gasoline
36" Gauge

**WEST PENN MACHINERY COMPANY**
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**1—18x24 Chuse Non-releasing Corliss Engine Generator unit, 125/150 lbs. steam, 200 rpm, #1350. Direct connected to 200 KW General Electric MPC, 250 volt generator #66103. Switchboard panel.**

*All in excellent condition.*

**Located close Terre Haute, Indiana.**
**Inspection at any time.**

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**Immediate Delivery:**

16, 24-yd. Koppel
9, 20-yd. Koppel
3, 20-yd. Western
24, 16-yd. Western
15, 16-yd. Kilbourne & Jacobs
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Illustrated specifications available
OTHER TYPES OF CARS TOO
Also Locomotives, Cranes, Shovels, Etc.

**IRON & STEEL PRODUCTS, INC.**
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"ANYTHING containing IRON or STEEL"

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## STEEL TIPPLE

Three track Roberts and Schaffer steel tipple with Marcus shaker screen and loading boom, 150 to 200 ton capacity.

Write **FS-595**, Coal Age
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## P & H SHOVEL

1—P & H Model 900 Diesel Operated Shovel, full revolving crawler tread, 40' boom 22' sticks with 3 yard rock dipper or 3½ yard earth dipper. First class condition, immediate delivery. Located Cooley, Minnesota.

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**CAP PIECES**

Any dimensions, delivered anywhere.
For information or sample, write to

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### MINING MACHINES
CE-7 Sullivan Shortwall 250 v. 6' bar
CE-7 Sullivan Shortwall A.C. 220/440

### MINE LOCOMOTIVES
4½ ton West. 250 v. 36/42" ga.
6 ton Atlas 220 v. 3 ph. 60 cy.
10 ton Milwaukee GASOLINE

### SUB-STATIONS
1—100 kw. West. 250 v. 2200/3/60 900 rpm. Syn.
100 kw. G.E. Rotary Synchronous 275 v. 1200 rpm. 2300/4000 transformers.

### TRANSFORMERS
3—10 kva. Pgh. 2200-220/110/1/60
2—25 kva. G.E. 2200-220/440/1/60
3—37½ kva. West. 22000-2200/1/60
1—50 kva. Burke 2200-110/3/60
2—75 kva. Burke 2200-110/3/60
1—100 kva. West. 2200-220/110v./1/60

### SPEED REDUCERS
Cleveland 200 AH 2 HP ratio 80:1
Thomas, 3 HP ratio 100:1
Cleveland 400 AH ratio 60:1 3 HP.
Cleveland 600 AT 10 HP. ratio 90:1

### LATHES
22"x10' Putnam Lathe

### SHAKER SCREEN
La Del Shaker Screen 62¼" wide, 8' long.

### JOY JR. LOADING MACHINE
1—12 B.U. 250 v. 42" ga.

### HOISTS
25 HP. Thomas 18" face 20" dia.
100 H.P. Lidgerwood 2 drum AC or DC Motor
200 HP Ottumwa capacity per day 1200 tons, cage travel
375 ft. size of rope 1⅛".
1—400 HP., Vulcan double cylinder conical Shaft Hoist 6' to 8' drums 2200 V.A.C. motor with starting equipment.
1—Goodman Duck Bill.

### SLIP RING MOTORS 3 ph. 60 cy.

| HP. | Make | Speed | Type |
|---|---|---|---|
| 700 | G.E. | 393 | MT-432 |
| 400 | West. | 1170 | CW |
| 260 | Burke | 600 | EM-65 |
| 200 | West. | 690 | CW-956A |
| 100 | West. | 1750 | |
| 75 | G.E. | 850 | —— |
| 75 | West. | 850 | CW |
| 60 | Triumph | 430 | —— |

### 230 V. D.C. MOTORS

| HP. | Make | Speed |
|---|---|---|
| 125 | G.E. | 1750 rpm. |
| 100 | West. | 250 |
| 85 | G.E. | 530 |

### 230 V. D.C. MOTORS (continued)

| | | |
|---|---|---|
| 75 | West. | 1700 rpm. |
| 75 | West. | 475 |
| 75 | Reliance | 1750 |
| 50 | West. | 975 rpm. |
| 50 | West. | 1700 rpm. |

### D.C. GENERATORS—230 V.
85 kw. G.E. 650 rpm.
80 kw. West. 265 rpm.
75 kw. G.E. 650 rpm.
70 kw. West. 575 rpm.
50 kw. G.E. 1150 rpm.
40 kw. West. SK. 1800 rpm.
35 kw. Cr. Wh. 900 rpm.

### A. C. Motors—3 ph. 60 cy.

| HP | Volts | Make | Type | Speed |
|---|---|---|---|---|
| 150 | 220/440 | West. | CS | 1800 |
| 150 | 2300 | West. | Syn. | 900 |
| 200 | 2200/440/220 | West. | CS | 250 |
| 200 | 2200 | G.E. | IK-15 | 1200 |
| 200 | 220/440 | West. | CS | 1200 |
| 200 | 220/440 | West. | CS | 720 |
| 200 | 220/440 | West. | CS | 600 |
| 225 | 2200 | West. | CS | 900 |
| 250 | 220/440 | West. | CS | 900 |
| 250 | 2200 | West. | CS | 1200 |
| 275 | 2200 | West. | CS | 1800 |
| 300 | 220/440 | West. | CS | 1150 |
| 300 | 2300 | West. | CS | 1200 |
| 300 | 2200/440/220 | West. | CS | 450 |
| 350 | 2200/440/220 | West. | CS | 450 |
| 400 | 2200/440/220 | West. | CS | 500 |
| 450 | 2200/440/220 | West. | CS | 600 |
| 500 | 2200/440/220 | West. | CS | 720 |
| 600 | 2200/440/220 | West. | CS | 900 |

### CENTRIFUGAL PUMPS
4x3 Harris, 320 rpm.
4x4 Weinman, 500 gpm.
6x6 Gould, bronze, 1300 gpm.
8x8 Weinman, bronze.
5x6 Hayton, 750 gpm.
6x6 Manistee, 750 gpm.
6x6 American, 1000 gpm., bronze.
6x6 Weinman, 1000 gpm.

### ENGINE GENERATOR SETS
300 kw. West. 250 V. D.C. dir. con. Skinner Universal Uniflow Engine
219 kva. G.E. 2300 v. or 220/440 v. 3 ph. 60 cy. dir. con. Ridgway Steam Engine.
70 kw. 250 v. DC. West. belted to 110 HP. 180 rpm. 2 cyl. Bessemer Gas Engine.

### AC GENERATOR
175 kw. G.E. 2300 v. 3 ph. 60 cy. 200 rpm. 80% P.F. (Can be reconnected to 220/440 v.)

### SHAKER CONVEYORS
2—London Class B. 300' pan line.

### TURBINE
1—Kerr Steam Turbine 450 BHP 3800 rpm., 5" intake 12" exhaust with Kerr Reduction Unit 3800 to 720 rpm., 115# pressure.

## DUQUESNE ELECTRIC & MFG. CO. . . . . PITTSBURGH, PA.

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## MINE LOCOMOTIVES
**5 to 20 ton.**

## MINING MACHINES
**Short and Arc Wall.**

## STRIPPING SHOVEL

## M. G. SETS & ROTARY CONVERTERS

## ROTARY DUMP
**With weigh pan & scale.**

## PUMPS and FANS

## COAL CRUSHERS

***Will buy, sell or exchange. What do you need?***

## THE INDUSTRIAL EQUIPMENT CORP.
**Warehouse: Carnegie, Pa.**
**P.O. Box 1647 Pittsburgh, Pa.**

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## FOR SALE

### BOILERS
2—400 H.P. Heine Cross drum water tube boilers, 3½"x16' tubes, delivering saturated steam at 160# gauge; complete with modern brick settings, Liptak arch, soot blowers.

### STOKERS
3—Illinois chain-grate stokers, 7' 11"x10' 0" grate surface, natural draft.

### STEEL STACK
1—Steel Stack 66" in diameter, 150' high.

Also incidental power plant items, miscellaneous electric equipment, 4" pipe-threading machine, duplex and triplex steam pumps, etc.

*The above items displaced on June 15, 1941, on account of changes in power supply. Are available for inspection at our plant at Paris, Illinois.*

## ILLINOIS CEREAL MILLS, INC.
**PARIS, ILLINOIS**

---

## MINE HOISTS

1—**Vulcan** 24" Band friction with 35 or 50 H.P. electrical equipment.
1—**Vulcan** 30" Band friction with 50 or 75 H.P. electrical equipment.
1—**Vulcan** Double drum shaft hoist with 100 H.P. motor.
1—**Lidgerwood** Haulage hoist 60" drum 6000 ft. 1⅛" rope, 300 H.P. electrical equipment.
1—**Lidgerwood** Band Friction Haulage hoist, 60" drum 6000 ft. 1⅛" rope and 300 H.P. motor and control.
1—**Diamond** Haulage hoist 60" drum 5000 ft. 1" rope and 200 H.P. motor and control.
1—**Ottumwa** Haulage hoist 72" drum 8000 ft. 1⅛" rope with 300 or 600 H.P. motor and control.
1—**Vulcan** Cylinder Conical Drum Shaft hoist, 350 ft. 1⅜" rope with 400 H.P. motor and control.

***And other hoists to suit all mining conditions***

## Jones Mining Equipment Company
**541 Wood Street Pittsburgh, Pa.**

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## JOY LOADING MACHINES FOR SALE

**Joy Loading Machines For Sale. 5 BU loaders, 250 volt, 42" gauge 50" height, 35 hp motors, all in first class operating condition. Can be seen in operation loading over 350 tons per shift in Central Illinois.**

**Several machines can be delivered each month.**

## Mining Machinery Sales Corp.
**1214 Fisher Bldg. CHICAGO, ILL.**

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## ROTARY CONVERTERS

500 KW WEST. SYN. 275 V. Pedestal Type. 6 Ph. 60 Cy. 1200 RPM. 2300/4000 V. Transformers
300 KW G.E. SYN. 275 V. HCC, 6 Ph. 60 Cy. 1200 RPM. form P. 2300/4000 V. Transformers.
300 KW G.E. SYN. 575 V., HCC, 6 Ph., 60 Cy., 1200 RPM, form P, 2300/4000 V. Transformers.
200 KW WEST. SYN. 275 V., 6 Ph., 60 Cy., 1200 RPM, Bracket type, 2300/4000 V. Transformers.
200 KW R.W. SYN. 275 V., 6 Ph., 60 Cy., 1200 RPM, Pedestal type, 2300/4000 V. Transformers.
150 KW R.W. SYN. 275 V., 6 Ph., 60 Cy., 1200 RPM, Pedestal type, 2300/4000 V. Transformers.

## MOTOR GENERATORS

215 KW AL-CH SYN. 275 V., 2300/4000 V., 3 Ph., 60 Cy., 100% P.F., 1200 RPM. Man Switchg'r.
200 KW G.E. SYN. 275 V. 2300/4000 V. 3 ph. 60 Cy. 80% P.F. 1200 RPM. Man. Switchgear.
150 KW R.W. SYN. 275 V., 2200 V., 3 Ph., 60 Cy., 100% P.F., 900 RPM. Manual Switchgear.
100 KW WEST. SYN. 275 V,, 2300 V., 3 Ph., 60 Cy., 100% P.F., 900 RPM. Manual Switchgear.

## LOCOMOTIVES

13-Ton WESTGHE, 250 V., 903-C mts., 36" Ga.
10-Ton GOODMAN, 250 V., 29-A Mts., 36" Ga.
8-Ton WESTGHE, 250 V., 906 Mts., 48"-36" Ga.
6-Ton WESTGHE, 500 V., 904-B Mts., 44"-36" Ga.
5-Ton WESTGHE, 250 V., 902-B Mts., 56½" Ga.
4-Ton WESTGHE, 250 V., 902-C Mts., 36" Ga.
4-Ton GOODMAN, 250 V., 32-A Mts., 44"-40" Ga.

***Each unit listed above is owned by us and is available now for immediate purchase.***

## WALLACE E. KIRK COMPANY
**Incorporated**
**501 Grant Building Pittsburgh, Pa.**

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## FOR SALE

2—200 KW Westg. Syn. Motor Generator Sets 600 V. D.C., Gen., connected to 290 H.P. Synch. motor 3/60/2200 and 900 RPM, with exciters and controls.
5—50 H.P. G.E. unused slip ring Type MTC Hoist & Crane Motors, 3/60/440 with new controls.
1—700 GPM, 200' hd. electric motor driven Manistee Water Pump, 3/60/2200.

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## BUY FROM A CONCERN BOTH FINANCIALLY AND MORALLY RESPONSIBLE

### LOCOMOTIVES

**Jeffrey:** 10 ton, 500 volt, 44" gauge, 8 ton, 6 ton, and 4 ton, all gauges, 250 volt.

**Goodman:** All 250 volts.
1—6 ton, 33-I-4T, 44"
1—6 ton, 30B, 48" 1—5 ton.
1—5 ton, W-I-2, 36"

**Westinghouse:** All 250 volt.
1—4 ton, 902, 48" 1—13 ton, 102, 44"
1—904 c. 44" 500 volt.

**G.E.:** All 250 volt, 5 ton 825, 44"
6 ton 803, 44", as is 4 ton 1022, 44, as is
6 ton 823, 44"

### MINING MACHINES

**Jeffrey,** 35B, 35BB, 29B, and 4—28A 250 V. 2—29C with drop bar support.

**Goodman,** 12A, 12AB, 12AA, 12G3A.
1—212G3 250 volt and 2—112DA, 500 volt.
2—Permissible Type 12CA.

**Sullivan,** CE7, CE9, CE10, CR10 Low Vein and Shearing Machine. AC and DC.

### SUBSTATIONS

**275 volts, D.C.**
1—200 KW **West.** M-G Set.
1—200 KW **Ridgeway** Converter.
100 KW **West.** Rotary Converter
2—150 KW. 2—100 K **Ridgeway** M-G Sets.
1—50 K **GE,** 1, 150 KW **West.** M.G. Sets.
1—150 KW **G.E.** HCC Rotary Converter.

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**ALUMINUM**

36"—48" and 60" with adjustable pitch blades.

AERIAL TRAMWAYS * HOISTS * PUMPS * MOTORS * TRANSFORMERS * BOND WELDERS * RESISTANCE, COMPRESSORS * CAR RETARDERS * DUMPS SPEED REDUCERS * FIELD FRAMES * ARMATURES * GOODMAN HYDRAULIC SHOVEL * MOTOR STARTERS AND CONTROLLERS—AC & DC * DROP BAR SUPPORTS (Gooseneck), 29B and 29C * MINING MACHINE TRUCKS * SWITCHBOARDS * CIRCUIT BREAKERS—AC & DC * CONVEYOR HOISTS COAL CRUSHERS, double roll 12"x16" single roll 24"x24" and 18"x16" * Sullivan BIT SHARPENER * TURBO-GENERATOR 500 K.W. 275 volt DC * ROPE & BUTTON CONVEYOR 400' long * LATHES, PLANERS, SHAPERS and BORING MILLS * LINK BELT, * ELECTRIC SLATE DUMP.

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**750 KW TURBINE**
Westinghouse Mixed Pressure 110# H.P.
2 to 4# L.P. 3600 RPM with gear box to 900 RPM, with accessories.
(Formerly connected to 750 KW 250 v. 900 RPM Gen.)

**SYN. MOTORS 3 ph. 60 cy.**

| HP | Make | V. | Speed |
|---|---|---|---|
| 350 | Al. Ch. | 2200 | 600 |
| 2—175 | Westgh. | 2200 | 600 |
| 2— 75 | Westgh. | 2200 | 900 |
| 75 | Westgh. | 220 | 1800 |

**M-G SETS 3 ph. 60 cy. (Syn.)**
150 KW West. 550 v. DC 2200 v. AC—1200 RPM
3—150 KW G.E. 550 v. DC 2200 v. AC 1200 RPM .8 PF
2—100 KW G.E. 250 v.—2300/4000 v. 1200 Rev. 70% P.F.
90 KW Al. Ch. 250 v. 2200 v. AC 900 RPM
75 KW West. 250 v. DC 2200 v. AC 900 RPM

**LOCOMOTIVES**
5 Ton Jeffrey Storage Battery 42 to 44" Ga. 2 BB motors, Battery box on top
6 Ton Whitcomb 250 v. 40" Ga.
1—4½ Ton Westgh. 36" Ga. 250 v. with reel
112 G 3 Goodman Ac Universal—36x42" Ga.
12 AR Goodman Dc Std. V502 36x42" Ga.

**MINING MACHINES**
2—CE 7 Sullivan DC Standard 30 HP
112 G3 Goodman AC Universal 220/3/60 36-42" Ga.

**SLIP RING & SQ. CG. MOTORS (3 ph. 60 cy.)**

| HP | Make | Speed | Wdg. | Type |
|---|---|---|---|---|
| 700 | G.E. | 393 | S.R. | MT 432 |
| 400 | West. | 500 | S.C. | CS |
| 300 | West. | 490 | S.C. | CS |
| 200 | West. | 580 | S.R. | CW |
| 200 | Cr. Wh. | 440 | S.R. | 28 |
| 200 | G.E. | 700 | S.R. | IM |
| 200 | Al. Ch. | 600 | S.C. | |
| 150 | West. | 720 | S.C. | CS |
| 125 | Al. Ch. | 435 | S.R. | |
| 100 | G.E. | 720 | S.C. | I K |
| 100 | F.M. | 600 | S.C. | BB |
| 75 | West. | 870 | S.R. | CW752C |
| 75 | G.E. | 690 | S.R. | I M |
| 75 | West. | 690 | S.R. | CW |
| 75 | West. | 575 | S.R. | CW868A |

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846 cu. ft. 65# Ing. Rand 2 stage ERI
550 cu. ft. 100# Bury 2 stage
355 cu. ft. 100# Pres. Laidlow Dunn Gordon
160 cu. ft. Chic. Pneu. 100#
140 cu. ft. Gardner Rix 100#

**CENTRIFUGAL PUMPS (Direct Motor Driven)**
700 GPM 277' DeLaval—75 HP Westgh. Syn.
1—260 GPM 277' Manistee—30 HP Westgh.
2—800 GPM 95' Head Union Steam Pumps.
600 GPM 78' head. Union Steam 25 P GE KET 1200 RPM A.C

**ENGINE GENERATOR SETS**
100 KW 250 v. DC Westgh.—Skinner Engine

**HOIST**
75 HP Ottumwas sgl. fr. drum 36" Dia. 30" wide 8" flanges geared 75 HP CI Westgh. slip ring motor with rev. drum control
75 HP Lidgerwood sgl fr. drum
50 HP Diamond 2 drums same Shaft
30 HP Clyde sgl. drum AC Motor
25 HP Thomas sgl. drum AC Motor
15 HP Lidgerwood sgl. dr. AC Motor

**DC MOTORS (230 Volts)**

| HP | Make | Speed | Type |
|---|---|---|---|
| 75 | West. | 1700 | SK |
| 40 | West. | 750 | SK-153 |
| 30 | West. | 600 | S-9 |
| 25 | West. | 875 | SK |
| 20 | West. | 900 | SK-100L |
| 15 | West. | 1200 | SK |
| 7½ (24) | G.E. | 825 | CVC |

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## CONVEYOR and TRANSMISSION BELTING

**CONVEYOR BELTING**
ABRASIVE RESISTANT COVERS

| Width | Ply | Top-Bottom | Covers |
|---|---|---|---|
| 48" | 8 | 1/8" | 1/16" |
| 42" | 5 | 1/8" | 1/16" |
| 36" | 6 | 1/8" | 1/16" |
| 30" | 6 | 1/8" | 1/16" |
| 30" | 5 | 1/8" | 1/16" |
| 24" | 5 | 1/8" | 1/32" |
| 24" | 4 | 1/8" | 1/32" |
| 20" | 5 | 1/8" | 1/32" |
| 20" | 4 | 1/8" | 1/32" |
| 18" | 4 | 1/8" | 1/32" |
| 16" | 4 | 1/8" | 1/32" |
| 14" | 4 | 1/16" | 1/32" |
| 12" | 4 | 1/16" | 1/32" |

**TRANSMISSION BELTING**
HEAVY-DUTY FRICTION SURFACE

| Width | Ply | Width | Ply | Width | Ply |
|---|---|---|---|---|---|
| 18" | 6 | 10" | 6 | 6" | 5 |
| 16" | 6 | 10" | 5 | 5" | 5 |
| 14" | 6 | 8" | 6 | 4" | 5 |
| 12" | 6 | 8" | 5 | 4" | 4 |
| 12" | 5 | 6" | 6 | 3" | 4 |

**ELEVATOR BELTING**
HEAVY DUTY RUBBER COVERED

| Width | Ply | Top-Bottom | Covers |
|---|---|---|---|
| 12" | 6 | 1/16" | 1/16" |
| 14" | 6 | 1/16" | 1/16" |
| 16" | 6 | 1/16" | 1/16" |
| 18" | 6 | 1/16" | 1/16" |

**ENDLESS "V" BELTS**
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"B" — WIDTH — All Sizes
"C" — WIDTH — All Sizes
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1—3 drum **HOIST**, Mfd. by Clyde Iron Works, with 200 HP G.E. Slip-ring Motor, Control, and Grids.
1—3 drum **HOIST**, 2 niggerheads. Mfd. by National Hoisting Engine Co., with 125 HP G. E. Variable Speed Motor.
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## WOOD PIPE for Mine Drainage

Wyckoff Wood Pipe has an 85 year record of perfect resistance to the corrosive action of sulphurous mine water. It is an ideal, long-time investment—light, easy to lay, and relatively low in first cost

We also manufacture a special Hard Maple Pipe for flushing culm in the Anthracite Region and wood covering for underground steam lines.

*shipments from stock day after receipt of order. Send for catalog.*

Established 1855

Emergency orders can be delivered by Truck to Mines in Pennsylvania Coal Fields following morning after receipt of same.

A. WYCKOFF & SON CO.

Office and Factory

No. 35 Home Street, Elmira, N. Y.

The Originators of Machine Made Wood Pipe

● We hope you have never had a lost-time accident due to wire rope. Some operators have—and *this* is no time to have workmen laid up with a blood-poisoned hand. Some operators have drastically reduced compensation claims by adopting American Cable **TRU-LAY PREFORMED**—the *safer* rope. . . . Being preformed, American Cable **TRU-LAY** is tractable—flexible—easy to handle. It resists kinking and snarling. Worn or broken crown wires lie flat and in place—refusing to wicker out to puncture hands or tear clothing. . . . Furthermore, being preformed **TRU-LAY** will last longer than ordinary cable. It has far greater resistance to bending fatigue. That means reduced machine shutdowns for replacement—steadier production—greater dollar value. . . . All American Cable ropes identified by the Emerald strand are made of Improved Plow Steel.

**AMERICAN CABLE DIVISION**
**Wilkes-Barre, Pennsylvania**

District Offices: Atlanta, Chicago, Detroit, Denver, Los Angeles, New York, Philadelphia, Pittsburgh, Houston, San Francisco

**AMERICAN CHAIN & CABLE COMPANY, Inc.** BRIDGEPORT, CONNECTICUT

**ESSENTIAL PRODUCTS** . . . AMERICAN CABLE Wire Rope, TRU-STOP Emergency Brakes, TRU-LAY Control Cables, AMERICAN Chain, WEED Tire Chains, ACCO Malleable Iron Castings, CAMPBELL Cutting Machines, FORD Hoists and Trolleys, HAZARD Wire Rope, Yacht Rigging, Aircraft Control Cables, MANLEY Auto Service Equipment, OWEN Springs, PAGE Fence, Shaped Wire, Welding Wire, READING-PRATT & CADY Valves, READING Electric Steel Castings, WRIGHT Hoists, Cranes, Presses . . . *In Business for Your Safety*

# Little Sister Strip Mine Adds to Original *LINK-BELT* Preparation Plant

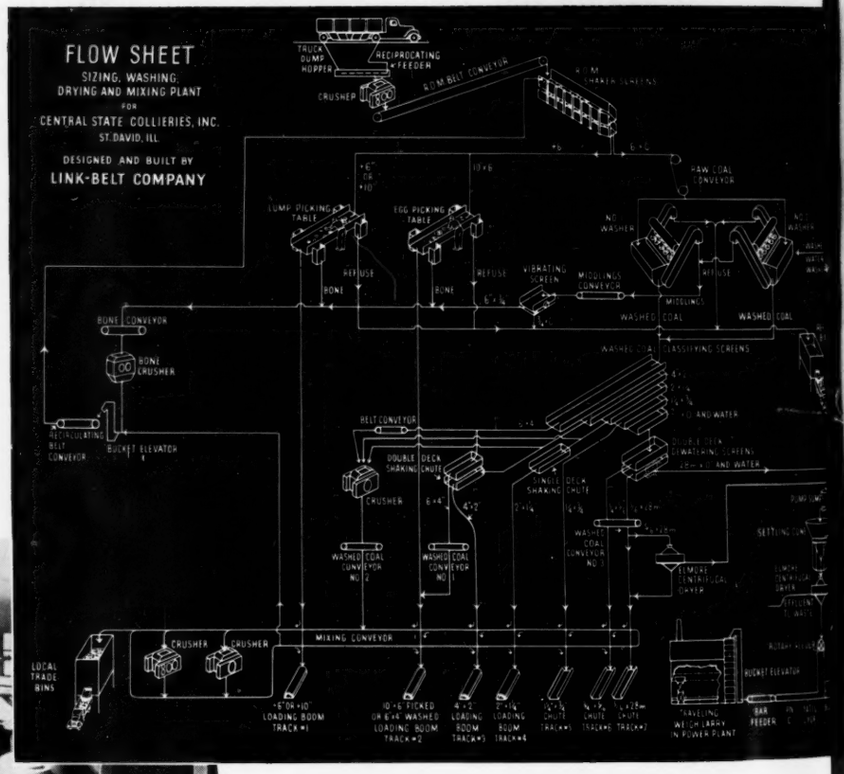
## *Flexible Layout* Provides for Present and Future Need

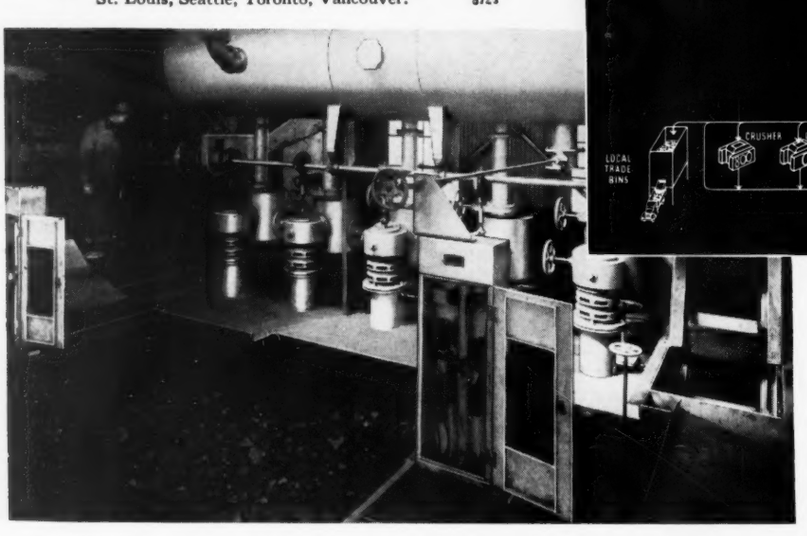
● To supply an expanding market with the product of this mine, which, since 1936, has been prepared in this Link-Belt designed and built plant, Central State Collieries, St. David, Ill., recently added to its facilities. Original equipment consisted of a Link-Belt air-pulsated washer for 2″ x 0″ coal with complete Link-Belt conveying and sizing units to handle all sizes.

By the addition of other Link-Belt units late in 1940, including another air-pulsated washing unit, capacity has been stepped up from 450 T.P.H. to 600 T.P.H. with all sizes up to 6″ now being washed.

**LINK-BELT COMPANY**

Chicago, Philadelphia, Pittsburgh, Wilkes-Barre, Cleveland, Huntington, W. Va., Kansas City, Mo., Indianapolis, Detroit, St. Louis, Seattle, Toronto, Vancouver. 8723



Left: One of two 5-cell Link-Belt air-pulsated washing units which wash 6″ x 0″ raw coal. The original plant provided for washing 2″ x 0″ coal.

Above: This flow diagram traces the progress of the coal from the haulage trucks through the sizing, washing, classifying and drying equipment to its ultimate disposal as marketable coal or boiler fuel.

**LINK-BELT** PREPARATION - EQUIPMENT

THE SYMBOL OF QUALITY LB LINK-BELT